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# The AMERICAN ARCHITECT AND BUILDING NEWS

Regular Edition

VOL. XC. OCTOBER 6, 1906. No. 1606.

SUMMARY: Pages 105-106

Dedication of the Pennsylvania Capitol at Harrisburg—Its History Not Altogether Pleasant—Why a Statue of Washington was Presented to Brooklyn, N. Y.—Honorary Degree for an Architect—Kitchens in Commercial Buildings—The Charles River Embankment, Boston.

HEATING APPARATUS—I. ..... 107

SWEDEN—III. ..... 109

EXPLOSIVE VAPORS AND DUSTS ..... 110

RESISTANCE OF BUILDING STONES TO FROST ..... 111

ILLUSTRATIONS ..... 111

Rood and Chapel Screens: Plates 34-41—Priests' House: St. James's Parish, Brooklyn, N. Y.—Providence Hospital, Washington, D. C.—Rear View of the Same—Tower of the Same.

ADDITIONAL:

Entrance Feature: Priests' House, St. James's Parish, Brooklyn, N. Y.

NOTES AND CLIPPINGS ..... 112

SOCIETIES, PERSONAL MENTION, ETC.

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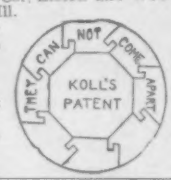


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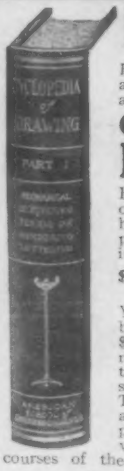


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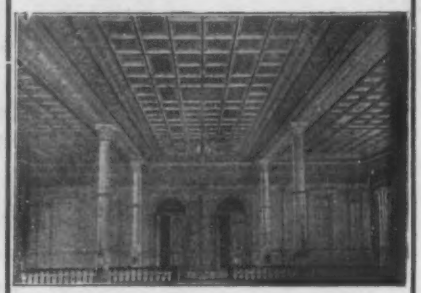

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# Alphabetical List of Advertisers

(FOR CLASSIFIED LIST, SEE PAGE 18)


A

Alsen Cement . . . . . xviii
American Air Cleaning Co. . . . . v
American Asphaltum & Rubber Co. xiii
American School of Correspondence. ii, xi
American Luxfer Prism Co. . . . . x
American Mason Safety Tread Co. . . xiv
American Rolling Mill Co. . . . . xvii
Andrews Co., A. H. . . . . xiv
Architect & Contract Reporter. . . . . ii
Associated Expanded Metal Co. . . . xvi
Atlas Portland Cement Co. . . . . xix
Automatic Mail Delivery Co. . . . . xiii

B

Barber Asphalt Paving Co. . e-o-w, xiv
Barret Mfg. Co . . . . . xiii
Batchelder & Co., C. H. . . . . xix
Berger Mfg. Co. . . . . ii
Bird & Sons, F. W. . . . . e-o-w, iii
Blome, R.S., Co. . . . . xx
Broad Gauge Iron Stall and Vane Works. . . . . xix
Building News. . . . . xiii
Butcher Polish Co. . . . . e-o-w, ix

C

Cairns, Hugh. . . . . xix
Campbell, Walter M . . . . . xiv
Cement Age. . . . . xiv
Chicago & Alton Ry. . . . . xvii
Chicago & Northwestern Ry. . . . . xvi
Clinton Wire Cloth Co. . . . . o-a-m, xix
Corrugated Concrete Pile Co . . xii, xiii
Cummings Filter Co. . . . . xiv
Cutler Mfg. Co . . . . . iii

D

Dadmun, Leon B. . . . . xix
Deane, E. Eldon. . . . . xiv
Dixon Crucible Co., Jos. . . . . ix

E

Elevator Supply and Repair Co. . . . . ii
Elston, A. A. . . . . xix
Emmel, Charles. . . . . e-o-w, xv
Engineering Agency . . . . . xi
Erickson Electric Equipment Co. . . xix
Expanded Metal and Corrugated Bar Co. . . . . e-o-w, vi

F

Favor, Ruhl & Co. . . . . e-o-w, xiv
Fire Proof Door Co. . . . . e-o-w, iii
Fisher Co., Robert C . . . . . ii
Fitzpatrick, F. W. . . . . e-o-w, xi
Flanagan & Biedenweg Co. . . . . ix
French & Co., Samuel H. . . . . ix
Frink, I. P. . . . . xi

G

Genasco Roofing Co. . . . . e-o-w, v, xiv
Gilbreth, Frank B. . . . . o-a-m, xii, xiii
Globe Ventilator Co. . . . . xix
Goodyear Tire & Rubber Co. . . . . xii
Gorham Mfg. Co. . . . . o-a-m, xi
Guastavino Co., R. . . . . o-a-m, xiii
Gurney Heater Mfg. Co. . . . . xx

H

Hartmann Bros. Mfg. Co. . . . . ii
Harvard University . . . . . iv
Hayes, Geo. . . . . viii
Hitchings & Co. . . . . ix
Holoplane Glass Co. . . . . e-o-w, xi
Huber & Co., H. F. . . . . iii

I

Illinois Steel Co. . . . . xx
Imperial Expanded Metal Co. . . . . xvii

J

Jackson Co., Wm. H. . . . . xx
Jenkins Bros. . . . . x
Johnson & Co., H. A. . . . . xix
Jones, T. W. . . . . e-o-w, ix

K

Keasbey & Mattison Co. . . . . o-a-m, xii
Kewanee Water Supply Co. . . . . v
Kinnear Mfg. Co., The. . . . . ii

L

Lane, John. . . . . vii
Loomis-Manning Filter Co. . . . . xii
Lord & Burnham Co. . . . . viii

M

Mass. Institute of Technology. . . . . iv
Miller & Bro., James A. . . . . viii
Morrill & Whiton Construction Co. . . xix
Morse Co., F. E. . . . . iv
Moss, Chas. E. . . . . xix
Mullins Co., W. H. . . . . e-o-w, viii
Mycenian Marble Co. . . . . o-a-m, x

N

National Fireproofing Co. . . . . e-o-w, vii
National Lead Co. . . . . e-o-w, xiii
Neuchatel Asphalt Co. . . . . x
New Jersey Zinc Co. . . . . o-a-m, ix
New York Belting & Packing Co., e-o-w, xi
New York Blower Co. . . . . x
Northwestern Terra Cotta Co. .e-o-w, iii

O

Okonite Co. (Ltd.). . . . . e-o-w, iv
Otis Elevator Co. . . . . vii

P

Pennsylvania Rubber Co. . . . . iv
Pitt Balance Door Co. . . . . iii
Pitt Iron Works, Wm. R. . . . e-o-w, iii
Prometheus Electric Co. . . . . xiii

R

Raymond Concrete Pile Co. . . . . iii
Rider-Ericsson Engine Co. . . . . xvi

S

Samson Cordage Works. . . . . e-o-w, x
Silver Lake Co. . . . . xix
Simpson Bros. Corporation. . . . . xix
Sleep, Elliott & King Co. . . . . xix
Sloane, W. & J. . . . . v
Smith Co., H. B. . . . . e-o-w, xvi
Society of Beaux-Arts Architects. . . . iv
Soltmann, E. G. . . . . xvii
Spaulding Print Paper Co. . . . . xix
Standard Fire-escape & Mfg. Co. . . . xix
Stanley Works. . . . . ix

T

Taylor, J. W. . . . . xiv
Technical Supply Co. . . . . o-a-m, xii
Thomas & Smith . . . . . xx
Thorn Co., J. S. . . . . e-o-w, ix
Troy Laundry Machinery Co. . . . . xx
Trussed Concrete Steel Co. . . . . vii

U

U. S. Mineral Wool Co. . . . . viii
University of Illinois . . . . . iv
University of Michigan. . . . . iv
University of Pennsylvania. . . . . iv

V

Vaile & Young . . . . . xx
Van Dort & Co., G. B. . . . . xi

W

Wagenhorst & Co., J. H. . . . . xiv
Washington University. . . . . iv
Wight, W. N., & Co. . . . . vi
Winslow Bros. Co., The. . . . . xv
Wirt, F. B. . . . . xiv
Wolff Mfg. Co. . . . . o-a-m, xii

Y

Yale & Towne Mfg. Co. . . . . xiii

# The American Architect and Building News

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## INDUSTRIAL INFORMATION

F. W. Bird & Son, East Walpole, Mass., have patented and are putting on the market a new cap for use with "ready" roofings (such as the Paroid Roofing, which they manufacture). It is made of new sheet steel and is claimed to be practically rust-proof, besides being of such a form as to give more binding surface than the ordinary round cap.

---

E. G. Soltmann, 125 East 42d St., New York, has brought out a "Builder's Uniform Sub-Contract." This form of contract between builders is approved by the American Institute of Architects and the National Association of Builders.

---

Albert Oliver, manager of the fireproofing department of the Clinton Wire Cloth Company, of Clinton, Mass., has moved from 150 Nassau Street to more commodious quarters in the Metropolitan Life Building, 1 Madison Avenue, the center of New York's building interests. The following are some of the more important structures in which the Clinton products have been used throughout: Electric power-house of the New York Central Railroad, at Yonkers, N. Y.; plant of the St. Croix Paper Company, Sprague Falls, Me.; Hamburger Building, Sonneborn Building, Fish & Produce Markets, Baltimore, Md.; City-hall, Newark, N. J.; new plant of the American Can Company, Hermitage Building, Tichenor-Grand Company's stable, Bliss residence, addition to the Long Acre Hotel, New York; U. S. Naval Coaling Station, at Sangley Point, Cavite, P. I.; harbor freight-sheds at Montreal; new plant of the Singer Manufacturing Company, at St. Johns, Quebec; Wells-Fargo Building, Portland, Ore., and the Fairmount Hotel, San Francisco, Cal.

---

On October 1, 1906, the Universal Portland Cement Company, a new subsidiary company of the United States Steel Corporation, took over the plants and business of the cement department of the Illinois Steel Company, and will continue the manufacture of "Universal" Portland cement. Edward M. Hagar, who has for six years been manager of the cement department of the Illinois Steel Company, is president of the Universal Portland Cement Company, with headquarters in The Rookery, Chicago. The Board of Directors consists of the following: Judge E. H. Gary, Chairman of Board of Directors, U. S. Steel Corporation; Mr. E. J. Buffington, Persident, Illinois Steel Company; Mr. A. C. Dinkey, President, Carnegie Steel Company; Mr. T. J. Hyman, Secretary and Treasurer, Illinois Steel Company; Mr. Edgar M. Hagar, President, Universal Portland Cement Company.

The present output of 6,500 barrels a day at South Chicago, Ill., and Buffington, Ind., is being increased by a new plant at Buffington with a capacity of 6,000 barrels a day and a plant at Universal, Pa., near Pittsburg, to have a capacity of 4,500 barrels a day. When the new plants are in operation, in the summer of 1907, the total output of the Universal Portland Cement Company will be over 17,000 barrels a day.

## BUILDING NEWS.

*(The editors greatly desire to receive information from the smaller and outlying towns as well as from the larger cities.)*

ANNAPOLIS, MD.—Bids will be received until Oct. 15, by G. Converse, Acting Secretary of the Navy, Washington, D. C., for the first building experiment station, Annapolis. Plans may be obtained at the office of Ernest Flagg, Architect, 35 Wall Street, New York, N. Y., upon a deposit of $10, of which sum $5 will be refunded upon their return.

ATHENS, GA.—It is reported that a company has been organized by J. J. C. McMahan, Jas. White and others to erect a hotel. Capital, $100,000.

A new college building is to be erected here for the University Agricultural Department at a cost of $100,000. J. J. Coemer is chairman of the committee in charge.

BALTIMORE, MD.—Reports state that plans are being prepared for the proposed child's hospital to be built on the grounds of the Johns Hopkins Hospital by the Harriett Lane Home for Invalid Children. Estimated cost, $250,000.

The Young Men's Christian Association is going to erect a building at Cathedral and Franklin Streets. Estimated cost $500,000.

Charles E. Cassell & Son, Architects, have prepared plans for a Christian temple, which is to be erected on Fulton Avenue, near Lexington Street.

The Baltimore Country Club, it is reported, has issued $100,000 bonds for the purpose of erecting a club house.

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Barboursville, Ky.—Architects Brown & Davis, Cincinnati, Ohio, are preparing plans for the construction of an administration and a dormitory building for the Union College of the M. E. Church at Barboursville. Cost, $50,000.

Bellefontaine, O.—The citizens, it is stated, are planning the erection of a high school to cost $60,000.

Berkeley, Cal.—According to reports, it has been voted by the citizens to issue bonds to the amount of $200,000 for the erection of a polytechnic school, $100,000 for the grammar school site and $20,000 for improving the high school.

Bismarck, N. D.—Bids will soon be taken for the construction of buildings at the Indian school. The appropriation is $50,000.

A 12-story building is to be erected at Beacon Street and Bay State Road, by a New York syndicate.

Bowling Green, Ky.—Plans are being prepared by James Knox Taylor, Supervising Architect, Treasury Department, Washington, D. C., for the 3-story stone and steel postoffice, of fireproof construction, to be erected here at a cost of $100,000.

Brooklyn, N. Y.—Plans are being drawn by F. M. Andrews, Waldorf-Astoria, for a high reinforced concrete factory building, 150 x250 feet, in size, for the H. Bridgeman Smith Company, of No. 491 Kent Avenue, to be erected on Kent Avenue, from Division Avenue to South Eleventh Street, Brooklyn. Mr. Andrews is now taking figures on the general contract.

Butte, Mont.—The labor leaders of the city, it is reported, are contemplating the erection of a labor temple to cost about $65,000.

Calumet, Mich.—Architect H. N. Hussey, of White & Hussey, Lansing, Mich., is preparing plans for the new Y. M. C. A. building. Estimated cost, $50,000.

Cambridge, Mass.—Peabody & Stearns, Architects, Boston, have drawn plans for a boathouse for the trustees of the Weld Boat Club of Harvard University. It will be located on the site of the old boathouse, on Charles River, Charles River Parkway and Boylston Street. It is to cost about $100,000. The dimensions are 158 x 78 feet, two stories.

Carthage, Ill.—Hancock county will vote on issuing $120,000 bonds for the erection of a courthouse.

Celina, O.—The Board of Education will receive bids until Oct. 12, for labor and material for the construction of a high school building in this city. W. W. Shock, clerk.

Chalmette, La.—The New Orleans Terminal Company, New Orleans, is receiving bids for the construction work on the big power house to be erected at a cost of $400,000.

Chapelhill, N. C.—Reports state that the University of North Carolina will erect a $100,000 library at Chapelhill.

Charleston, S. C.—Bids are asked by the Bureau of Supplies and Accounts, Navy Department, until 10 A. M., Oct. 16, for the installation of a plumbing system in building No. 2, Navy Yard. H. T. B. Harris, Paymaster-General, U. S. N.

Chattanooga, Tenn.—It is stated that $110,000 will be expended in the erection of an addition to the custom house here.

A permit has been granted for the erection of a 14-story building to be erected on Eighth Street, between Chestnut and Broad Streets, at a cost of $300,000, by C. E James. The contract has been awarded to W. S. Holmes.

Cheyenne, Wyo.—The War Department has authorized plans and specifications and the advertising for bids for thirty-six new buildings, to cost $700,000. Capt. V. T. Hart, Constructing Quartermaster, Fort D. A. Russell.

Chicago, Ill.—Architects D. H. Burnham & Co., Railway Exchange building, northwest corner of Jackson Boulevard and Michigan Avenue, have completed plans for a field house to be built in one of the new small parks, at Forty-sixth Place and Princeton Avenue, known as No. 4 Square, for the South Park Commissioners, office in Washington Park, Cottage Grove Avenue and Fifty-seventh Street. J. F. Foster is the board's superintendent and has charge of the work. It will cost $70,000 to $80,000. Bids are now being received.

Architects Holabird & Roche, Monadnock block, have prepared plans for a store and office building to be built on the vacant lot on the east side of Dearborn Street, just north of the Real Estate Board building, northeast corner of Dearborn and Randolph Streets, for Lyman, Lyman & Lovell, represented by Aldis & Co. It will be 10-story, 110 x 40 feet, of fireproof steel construction, have pressed brick and terra cotta fronts, composition roof, hardwood finish, steam heat, electric light, marble and tile work, and is estimated to cost $200,000.

Architect Myron H. Church, Marquette building, 204 Dearborn Street, is completing

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plans and contracts will be let shortly for a manufacturing plant to be built on about four acres of land at the northeast corner of Lumber and Canal Streets, extending to Seward Street, for the Heath & Milligan Manufacturing Company, paint and color makers, 170 and 172 Randolph Street. It will be 4-story, of mill construction, with concrete foundation, have brick exterior, composition roof, concrete floors, iron beams and girders, stem heat, electric light, and is estimated to cost approximately $200,000.

It is reported that $250,000 will be spent in erecting a new Ghetto. Robert R. McCormick, president of the Sanitary District of Chicago, has given $100,000 toward the needed $250,000.

It is reported that Hannah & Hogg, 307 Washington Street, will build a large new hotel at Randolph and Clark Streets. According to the reports Marshall & Fox, Architects, 164 Dearborn Street, will prepare plans for the new building, which is to be twenty stories high, of absolute fireproof construction, and which will contain hotel and theater. The cost will be about $1,500,000.

Plans are being prepared for a 6-story building to be constructed on Jackson Boulevard, near Aberdeen Street, at a cost of $100,000, for the Curtis-Leger Fixture Company, and the National X-Ray Reflector Company.

A large new warehouse will be built at Grand Avenue and Jefferson Street for A. Booth & Co., 143 Dearborn Street. Dean & Dean, Architects, 218 La Salle Street, have made designs, which call for a 2-story building 110 x 240 feet. It will be built of brick, stone and iron, and cost about $100,000.

The Coda heirs are having plans prepared for an 8-story mercantile building to be erected at La Salle and Polk Streets. It will cover an area of 50 x 100 feet, and will be of pressed brick and stone, the interior being of mill construction. It will cost $100,000.

Delos W. Potter will build a large apartment house at the intersection of Graceland, Clarendon and Evanston Avenues, on the North Side. It will be three stories high and will contain thirty apartments of four and five rooms each. It will cost about $80,000.

It is reported that a building, costing about $150,000, is to be erected for the Old People's Home.

It is reported that contracts will soon be let for erecting the George Smith annex to St. Luke's Hospital, at a cost of about $500,000.

CHISHOLM, MINN.—It is stated that plans have been prepared for a high and grade school to be erected at a cost of $70,000.

CINCINNATI, O.—It is reported that Architects Samuel Hannaford & Sons, Hulbert block, have prepared plans for a hotel for George Falter. Estimated cost, $500,000.

F. Walter Stephens, of St. Paul, Minn., it is stated, has secured first prize and J. F. Sheblessy, of Louisville, Ky., the second prize for the plans for the Hughes High school, to be erected at McMillan and Clinton Streets, Cincinnati, at a cost of $500,000.

Plans have been prepared by Architects Elzner & Anderson, 136 Ingalls building, for an 8-story factory for Julian & Koplugo. Cost, $300,000.

CLEVELAND, O.—The Euclid Realty Company will build a 4-story brick apartment house on Euclid Avenue, near Edgemore Place, at a cost of $75,000.

The Eldridge & Higgins Company will erect a 9-story building to be located at Huron and Ontario Streets. Richards, McCarty & Bulford, 63 The Ruggery, are architects.

F. S. Barnum, Rose building, it is stated, is to revise the plans for the manual training school which it is proposed erecting on East Fifty-fifth Street and Scoville Avenue so as to bring the cost within the amount available, which is $300,000.

Anthony Carlin, owner of the Hotel Euclid, has purchased the adjoining property and will erect a fifteen-story hotel on the site. There will be 900 rooms beside the public dining rooms; also a roof garden and theater covering the entire roof, and five new passenger elevators will be installed.

COLORADO SPRINGS, COLO.—Plans are being revised by James Knox Taylor, supervising architect, Treasury Department, Washington, D. C., for the postoffice and government building at Colorado Springs. Estimated cost of building, $150,000.

COLUMBUS, O.—Plans have been prepared by Architect Wilbur T. Mills, 233-237 North High Street, for the erection of a $50,000 church for the Central Christian church, Rev. W. S. Priest, Fair Avenue, pastor.

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Salem, O.

Dallas, Tex.—It is reported Howard Kenyon, of the Stevenson-Kenyon Contract Company, has secured the contract for the erection of the hotel for Lucas Bros., at a cost of about $400,000.

Decatur, Ill.—The Pythian Home Committee, representing the Grand Lodge of the Knights of Pythias, E. R. Wright, secretary, Taylorville, Ill., invites architects to submit sketches, with elevations, for a Pythian home for widows and orphans to be built on forty acres of land at Decatur, Ill. It is to be known as the administration or main building, have sufficient rooms and dormitories for present needs, and cost $100,000 to $150,000. The compensation for the successful architect will be such as the committee may consider reasonable. The committee will meet in Chicago on November 7 to consider the sketches, and if any of them is approved, the same will be recommended to the Grand Lodge, which meets in Chicago on November 8. It is desired that the sketches shall follow as nearly as possible the plans of the Pythian Home at Springfield, Ohio. Address all communications to Mr. Wright. E. W. Barkman, representative of the Decatur Pythian Home Committee, Decatur, Ill., has charge of the work.

Denver, Colo.—O. L. Johnson, it is stated, has secured a site at Grand Avenue and Fourteenth Street, and will erect an 8-story fireproof apartment hotel, to cost about $250,000.

Reports state that C. A. Smith, of Boston, and other Eastern capitalists have organized the Flint Automobile Company and will erect a factory which will cost $600,000. Rufus W. Dean, Boston, Mass., president.

Denver Lodge, No. 17, B. P. O. Elks, W. H. Wheadon, secretary, has purchased a site for a building, to cost about $125,000. Architect J. J. Huddart, Bank block, is drafting the plans.

Detroit, Mich.—It is proposed to erect a $150,000 administration and exhibition building on the State Fair Grounds. A. E. Stevenson is general superintendent.

We are advised that Donaldson & Meier are preparing the drawings for the new Y. M. C. A. building, which will cost about $300,000.

We are advised that the Northern Manufacturing Company, Champlain and Canton Streets, will erect one of the largest plants in the West for the manufacture of automobiles.

Dover, N. H.—Plans are being prepared by Architects Hartwell, Richardson & Driver, 56 Grove Street, for a new Masonic hall to be constructed here, at a cost of $80,000.

Excelsior Springs, Mo.—Plans are being prepared for hotel to be erected by I. J. Ringolsky, New York Life building, Kansas City, Mo., and M. A. Isaacs, New York, N. Y., at a cost of $200,000.

Fort Collins, Colo.—The erection of a Y. M. C. A. building at Oak and Remington Streets, to cost about $60,000, is reported under consideration.

Fort Dodge, Iowa.—Reports state that the First National Bank will erect a 6-story office building, 60 x 140 feet.

Fort Meade, S. Dak.—Bids are asked by Maj. R. B. Turner, Constructing Quartermaster, until 2 P. M., Oct. 13, for construction, plumbing, electric lighting and electric lighting fixtures, for a one-company barrack.

Fort Smith, Ark.—A company incorporated, with W. J. Echols as president, will build a large office building, 50 x 140 feet, to be erected on Garrison avenue. Cost, $150,000. J. J. Klinciensmith, Fort Smith, is the architect.

Franklin, Pa.—William Young Brady, architect, has prepared plans for the $80,000 jail which is to be erected in this city. It is to be a building with stone exterior and steel interior.

Glass, N. C.—Reports state that two large cotton mills will be erected at Kannapolis, a town two miles from Glass, by James W. Cannon, of the Cannon Manufacturing Company, Concord, N. C. Yarns and cloth will be made. Cost, $2,000,000.

Grafton, W. Va.—The Baltimore & Ohio Railroad Company (D. D. Carothers, chief engineer, Baltimore, Md.), it is reported, is about to erect a depot here to cost probably $100,000.

Granite City, Mo.—It is reported that an Alton syndicate has purchased the triangle lot at Nineteenth Street and Nedringhaus Avenue, from C. F. Stelzel and will erect a three-story hotel, 208 x 208 feet, with eighty guest rooms, to cost about $50,000.

Grass Valley, Cal.—It is reported that the city will erect and install a municipal lighting plant at a cost of $80,000.

Greensboro, N. C.—J. C. Morris, it is stated, has secured the contract to erect a club house for the Lodge No. 602, B. P. O. Elks, at S. Greene and W. Sycamore Streets, at a cost of about $400,000.

Greenport, N. Y.—Application has been made to erect a $1,000,000 abattoir at the foot of Oak Street by Plant Bros.

Greenville, Miss.—A saw mill and box factory to cost about $400,000 will be erected here by the Holley-Matthews Manufacturing Company.

Harriman, Tenn.—Reports state that forty acres of ground have been purchased by the American University on which it proposes to erect new buildings.

Houston, Tex.—Henry F. Jones, it is stated, is preparing plans for the Stewart office building, which is to be erected at Preston Avenue and Caroline Street. It is to be eight stories, of reinforced concrete.

Indianapolis, Ind.—Plans have been ordered for the improvement and erection of a large dormitory for the Indiana Industrial School for Girls. Bids will be in order in a few days. Mrs. John B. Elam, president board of trustees.

It is reported that the board of trustees of the Women's Prison have ordered plans prepared for a dormitory and other improvements.

It has been announced the plans of Rubush & Hunter, for the city hall and coliseum to be erected on Market Street, have been accepted, and detailed plans and specifications will be completed and bids for the erection asked for in about sixty days Probable cost, $400,000.

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KALAMAZOO, MICH.—It it stated that a 6-story business building is to be erected on Main Street for the Edwards & Chamberlin Hardware Company.

KANSAS CITY, MO.—The Building Committee of the Union Depot Company, it is stated, adopted plans of Jarvis Hunt, of Chicago, Ill., for the Union passenger station to be erected here.

Architect Jarvis Hunt, of Chicago, will let contracts shortly for a bank and office building to be built at Kansas City for the National Bank of Commerce, W. S. Woods, president. It will be fifteen stories, 115 x 116 feet, of steel construction, have pressed or paving brick and terra cotta exterior, composition roof, partly mahogany finish, steam heat, electric light, the latest improvements, and is estimated to cost about $1,500,000.

KEYSER, W. VA.—The citizens of Mineral county have voted $50,000 bonds for erecting a new courthouse.

KNOXVILLE, TENN.—A business building for hardware purposes will be erected by Charles Hasson, N. M. Bonham and Samuel House at a cost of $50,000.

LEWISTON, MONT.—Plans are on foot looking towards the erection of a courthouse here to cost $100,000.

LIMA, O.—Reports stated that the plans of Dawson & McLaughlin have been accepted by the public library board for the $30,000 library building, the gift of Andrew Carnegie, to be located at the corner of McDonel and West Market Streets.

LITTLE ROCK, ARK.—The members of Post A of the Travelers Protective Association, it is stated, are contemplating the erection of a $50,000 hospital.

LOS ANGELES, CAL.—The Central Building Company, it is reported, will erect a large department store, to be located on the north side of Fifth Street from Spring to Main. Cost, $1,500,000.

A. B. Benton, 114 N. Spring Street, it is stated, has prepared plans for a Y. M. C. A. building, to be erected at 717 S. Hope Street.

J. C. Austin, architect, is stated to have plans under way for the sixty-room hotel building which is to be erected on the property at the corner of Wilshire Boulevard and Coronado Street.

LOUISVILLE, KY.—It is stated that the contract will be let in November for a 4-story annex of granite and stone to city hall, for which plans have been prepared by James P. Curtin, architect. Estimated cost $125,000. Contract for constructing granite base has been let to the Peter & Burghard Stone Company.

MALDEN, MASS.—It is reported that Mead, Mason & Co., of Boston, have been awarded the contract to erect the addition to the high school for $250,000. Cooper & Bailey, 60 Congress Street, are architects. It is to be a 3-story, brick and limestone building, 320 x 100 feet.

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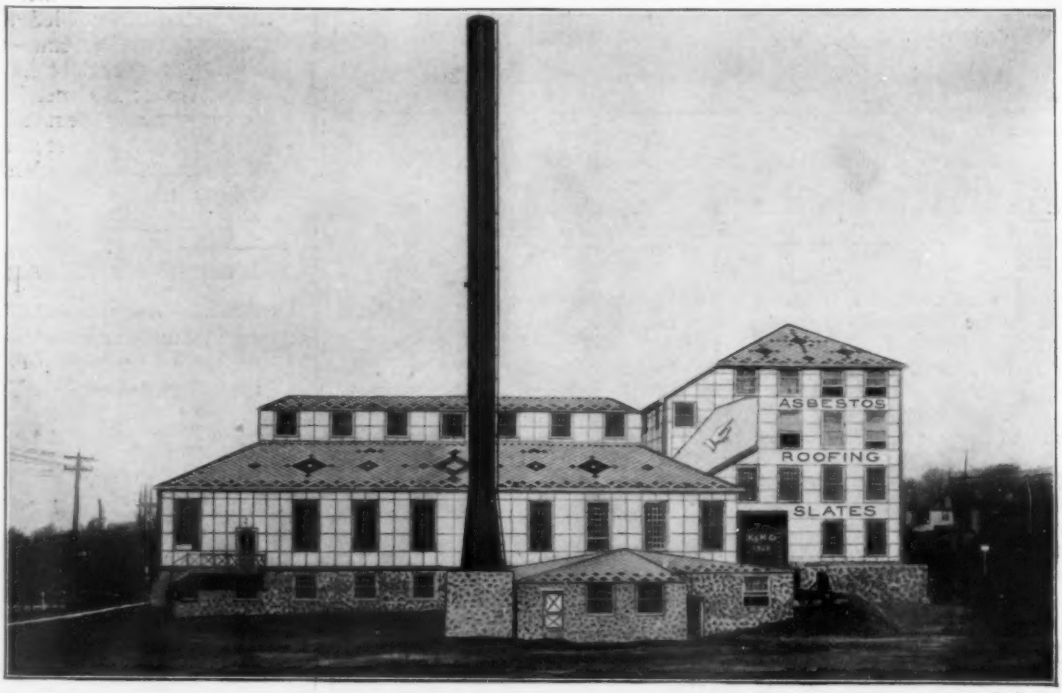


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## CONTENTS


SUMMARY . . . . . 105-106

The Dedication of the Pennsylvania Capitol at Harrisburg—Its History Not Altogether Pleasant—Why a Statue of Washington was Presented to Brooklyn, N. Y.—Honorary Degree for an Architect—Kitchens in Commercial Buildings—The Charles River Embankment, Boston.

HEATING APPARATUS—I. . . . . 107

SWEDEN—III. . . . . 109

EXPLOSIVE VAPORS AND DUSTS . . . . . 110

RESISTANCE OF BUILDING STONES TO FROST . . . . 111

ILLUSTRATIONS: . . . . . 111

Rood and Chapel Screens: Plates 34-41—Priests' House, St. James's Parish, Brooklyn, N. Y.—Providence Hospital, Washington, D. C.—Rear View of the Same—Tower of the Same.

*Additional:* Entrance Feature: Priests' House, St. James's Parish, Brooklyn, N. Y.

NOTES AND CLIPPINGS . . . . . 112

SOCIETIES, PERSONAL MENTION, ETC.


PHILOLOGY is an entrancing study, especially since simplified spelling has come to throw its light on the darker problems. Through its aid we have the right clue at last to that puzzling word, "Capitol," and can derive these rightful permutations: Capitol, State-house, ship-of-State, *navis*, knavery, home of thieves! If one keeps in mind this illuminating bit of lore, the history of the Capitol at Harrisburg, which was dedicated with fitting ceremonies during the present week, will seem not so much revolting as brutally natural; though ceremonies that would really comport with the building and its history would have to be an orgie that could be seen fately only from the galleries. When, in February, 1897, the old building was burned, the Legislature at once enacted into statute law that there should be built and delivered, complete, a fireproof Capitol, ready for the next Legislative session, and that its cost should not exceed $550,000. At the appointed time there was delivered by the architect and contractors a building that was accepted by the Legislature as the "complete" and "fireproof" building required by the law. In face of this acceptance, could any one doubt that architect, builders and building-commission had achieved a singular success? No, because it was singular; inexpressibly so. But, curious as it was, it is not nearly so odd as the fact that some six years later this building, already accepted and dedicated as complete and fireproof, was again dedicated on the fourth current, and that its cost is a matter which apparently cannot be got at. A few weeks ago the administration newspapers made a great boast that, out of the appropriation of $4,000,000, the building-commission would be able to turn back to the treasury an unexpended balance of $400,000. The opposition papers at once pointed out that this attempt to make the public believe the cost was less than the appropriation was a sham, since this sum did not cover the cost of heating and ventilation, decoration, furnishing, terracing, vaults, etc. More recently still an official statement has been issued by the building-commission which states the cost as $12,601,922.18, which is quite another story than the $550,000 for the building the Legislature in 1897 knew would be good enough for their quadrennial sessions. But there seems reason for doubting whether the building-commission itself knows what the cost is, for the State Treasurer, the member of the commission who, of all others, should know most about the actual cost, has declined to sign his name to the report!

WE doubt if any building in this country, or elsewhere, is burdened with so unpleasant a history as overshadows the new State-house for Pennsylvania. The first competition was fairly conducted and adjudged, but the politicians would not allow it to stand, and a second competition was ordered, competitors being allowed ten days or so. Angered by the evidence given of intentional unfair play, the Philadelphia Chapter, A. I. A., succeeded in inducing the greater number of the architects of the State to have nothing to do with the affair. Mr. Henry Ives Cobb won this second competition, and the complete and fireproof Capitol he produced at the appointed time was nothing but a shell of rough brickwork, palpably awaiting its outside lining of marble, and unmistakably confessing itself to be but the central portion of a State-house building of the standard type, which needed wings for its completion, while the interior, crudely treated as it was, showed that up to that point the building certainly was not fireproof. How it came about that, after in this way having given proof that he understood the problem as his employers understood it, Mr. Cobb was not allowed later to carry on the work, we have never understood; but he was not, and a third competition had to be held—again without the aid and countenance of the great majority of Pennsylvania architects. This competition was won by Mr. J. M. Huston, who incorporated into his own design Mr. Cobb's central body, and who only a few days ago was acclaimed throughout the State an architect of unusual ability, seeing that he had built a four-million-dollar Capitol and had four hundred thousand dollars unexpended!

AS byplays to the main drama, we have suits brought against the Building Commission by certain competitors in the first competition, because they didn't win. We find an attempt made to send Mr. Cobb to Coventry because he did win. We find one of the oldest and most respected architects of Philadelphia expelled from the Philadelphia Chapter because he chose to consider he was not subject to trade-union principles, and elected to enter the third competition. We find, shortly after, the man upon whom this stigma had been so needlessly placed suing in the courts, and successfully suing, for reinstatement in his membership in the said Chapter. We have the scandal of the bronze doors decorated with the busts of "machine" bosses and their ilk. We find the noble trees in the Capitol Park saved from the axe only by the most strenuous efforts of the ladies of Harrisburg, who valued their umbrageous charms far above those of the most ornate stone wall and terracing that Mr. Huston could devise, and we could keep on a long time reciting similar regrettable facts which this building has occasioned. In


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spite of universal surprise at finding the building has already cost eight millions more than was announced to be the case, the newspapers make a gallant attempt to believe it has all been honestly expended. At the same time the *Public Ledger* declares that "the idea of putting two million dollars of lighting-fixtures into a four-million building is so astounding as to baffle criticism." Perhaps when the State Treasurer is ready to turn on his light, even this may be explained.

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MANY an architect, who, in the spirit of old-fashioned courtesy, has found himself obliged to waste time at the opening ceremonies of some important public building he has designed, must have chuckled inwardly as, finding himself as unconsidered as a bridegroom at a wedding breakfast, he contrasted his fate with Mr. Pecksniff's. In the same way, Mr. Henry M. Shrady, sculptor of an unusually good equestrian statue of Washington that was unveiled in Brooklyn last week, may have smiled grimly when in some newspaper accounts of the event he found no mention of his name as the creator of the monument, while full particulars were given about Mr. James R. Howe, who paid for it. For the latter exploitation there was good reason, and the story is interesting and unusual enough to record. Feeling, with many other good citizens, that the fee system which provided for the payment of certain important officials of King's County was iniquitous in itself and burdensome on the public—the fees sometimes being equivalent to an annual salary of fifty thousand dollars—Mr. Howe secured election as Register on his promise that he would return to the public all the fees collected during his term of office, less what he found to be a reasonable salary for the work his office actually imposed on him. As the law still remained in operation, the fees had to be paid to and accepted by him, and people waited with interest to learn how large a sum would be refunded. Whether such was his intention at the outset, or whether Mr. Howe later perceived there was more than one way of interpreting his ante-election pledges, we do not know, but the fact is that he decided that, instead of refunding the unearned increment in cash, he would give the public the full benefit of it by erecting for their pleasure the best monument that could be procured. This was done, and if there was a little flavor of the late Phineas T. Barnum's methods in the procedure, the citizens can afford to overlook it in face of the excellent statue that immortalizes Washington as well as Mr. Howe, and in view of the fact that Mr. Howe's action has brought about the disestablishment of the fee system.

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BUT all architects do not have the discomfort of finding themselves entirely outclassed at ceremonial occasions by the humblest member of the political building-committee. During the prolonged ceremonies that marked the opening of the great group of new buildings for the Harvard Medical School, in the Fenway, Boston, Mr. Charles A. Coolidge, of the firm of Shepley, Rutan & Coolidge, the architects of the buildings, had the unexpected pleasure of being called on to stand up and receive the degree of Doctor of Arts at the hands of the president of his own *alma mater*, a degree that has taken on a new significance since the establishment at Harvard of the "courses in Fine Arts," and particularly since the opening of the School of Architecture. Mr. Coolidge was formerly fortunate enough to receive, as being the designer of the United States Building at the last Paris Exposition, a decoration from the French government; but we fancy he will cherish more highly the honor he has just received, although it is not one he can wear in his buttonhole.

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DOCTORS and physiologists are inclined to unite in recognizing as an important, if not the most important, factor in the very notable physical change that has taken place in American mankind during the last sixty years, the fact that Americans to-day have much better food and a far greater variety of it than their fathers had. The kitchen and the needs of the ministering spirits that there preside have been pretty thoroughly mastered by architects who, if not leaders in the reform, have at least been good forwarders of it; but we doubt if many architects yet realize that a kitchen may nowadays be held as a proper adjunct of almost every building that they are called upon to plan. The bountiful market of canned stuff, and the improved apparatus for burning fuel-gas, make it possible to install a very serviceable kitchen in a very small space. Probably no architect nowadays would plan a bachelor's apartment-house without arranging certain suites in such a way that a kitchenette could be installed, if the tenant wished. There are indications that the same sort of provision should be made in office-buildings and commercial buildings, and a busy man, who is not able to spare the time to go out to club or restaurant, and who has no relish for the half-warm lunch he can have sent in from outside, might relish the suggestion that a kitchen could be introduced in the planning of his office. The department-stores and the great insurance offices have had kitchens and dining-rooms in operation for years, and we believe that, now, commercial clients—banks, corporations and large mercantile houses—would be glad to have their architects incorporate in the plans of their buildings a well-appointed kitchen capable of meeting the noonday needs of the head officials of the concern. It might not be bootless to ask such clients: "Shall we include a kitchen?"

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IT is welcome news that, at last, bids have been received in Boston for the construction of another, a large and important, section of the Charles River Embankment, the first that will begin to give actual shape to the Charles River Basin that is to become such an important feature amongst that city's attractions. If now and then some Bostonians wish that more Western "hustle" could be injected into the conduct of public affairs, they very shortly come to realize that the desirable improvements are being carried out, and in a much better way for the city's permanent benefit than if they had been put in hand at the first suggestion and rushed to completion with all possible speed.

## HEATING-APPARATUS—I.

DURING the early fall of each year architects frequently hear from friends and clients, "What is the best furnace?" or, perhaps, "What shall I put in to heat my house?" The injudicious architect is apt to reply to this question with a promptness which he sometimes has occasion to repent of afterwards; for few things are more difficult than to adapt satisfactorily a heating-apparatus to the requirements, or, possibly, the whims, of the people who are to use it. One person has a very large house to warm; another has a small one; a third has a passion for fresh air, and is not happy unless he feels a breeze constantly blowing upon him; while a fourth lives in deadly fear of draughts. A fifth cannot breathe in an atmosphere which is not kept constantly moist; while a sixth takes cold in such an atmosphere; and, of the seventh and eighth, one requires an average temperature of eighty degrees in his house in winter, while the other is uncomfortably warm with the thermometer at sixty. Of course, none of these people mention their abnormal tastes, and it is left to the architect to divine what they really want, and to supply it, according to his judgment and experience, without offending them by appearing to notice their eccentricities.

In general, tall, thin and old people like to be warm. Their circulation is poor, and their feet and hands, in consequence, disposed to be cold. Moreover, as their respiration is apt to be superficial, in correspondence with the sluggish action of the heart, they are, as a rule, less sensitive to impure air than persons of more vigorous constitution. Such people, therefore, usually, although not always, prefer a powerful heater, such as a wrought-iron furnace, or direct steam radiation, either of which affords them an opportunity for warming their feet and hands, at the same time that they breathe a hot, stimulating atmosphere.

Where people of this temperament are happy, those of a more vigorous constitution are wretched. Such persons, coming, in winter, from a brisk, healthful walk into a room suited to an old or anæmic subject, break out into a perspiration which is not only annoying, but dangerous; their heads throb with the stimulus imparted by the heat to the circulation, and they gasp for the oxygen to which their lungs are accustomed.

Children, again, require special treatment. Being active, and having rapid circulation and sensitive lungs, they need plenty of fresh air, at a temperature not too high; but they have little power of resistance to cold, and a chilly atmosphere, in rooms for their use, must be avoided. It is to be remembered, also, in arranging for children's day-rooms, that the little people live in the stratum of air next the floor, which is always at a lower temperature than that in which their elders move, and is often so much cooler than the air above it that young children, playing on the floor, may be seen with their hands and faces blue with cold, while the grown people about them are perfectly comfortable.

For children's rooms, the sovereign remedy for this state of affairs, which, in conjunction with the cruel fashion of dressing babies so as to show their little bare legs and arms, has brought desolation to many a household, is to provide an open fire. A simple fire on andirons, in a brick or soapstone fireplace, is a rather inefficient heater for our climate, so that warm air should, in addition, be brought into the room from a register, or around the fireplace itself; or a jacketed open stove, with air-supply from outside, may be substituted for the fireplace. By any of these devices not only is the atmosphere of the room kept pure, and at a comfortable temperature, but the floor in front of the fireplace or open stove is warmed by direct radiation from the blazing fuel, so that it imparts warmth to the little limbs, instead of chilling them, at the same time that the temperature of the general atmosphere of the room may be kept low enough to avoid debilitating the children. Of course, little children must be kept from falling into the fire, or trying experiments with it, by an efficient guard. This will generally have to be made to order, as nothing suitable is kept in stock, and should be three feet high, of heavy wire netting, in an iron frame, forming three sides of a square, about three feet on each side. Such a screen will be heavy enough not to be easily tipped over, and will keep the children at a sufficient distance from the fire, while it can be bronzed or painted, so as to be inoffensive in appearance.

Grown people, especially invalids, would often find advantage in the cheerful radiation, and the rapid change of air, afforded by an open fire; but an open fire involves labor and expense, and is not usually sufficient for comfort in the American winter climate, so that some form of what the Germans call "central heating" is practically indispensable for our houses; and, as the central apparatus is generally presumed to have capacity enough for warming the house without aid from open fires, the latter have come to be looked upon as luxuries, to be only sparingly indulged in.

A generation ago, the most common device for central heating in American houses was the "hall stove," a large sheet-iron stove, set up in the staircase hall, often with its smoke-pipe carried up through the well of the staircase, as additional heating surface, nearly to the top of the house. Although the sight of one of these stoves, with its red-hot funnel carried up twenty or thirty feet through the narrow well-room of a pine staircase, was calculated to give an insurance man bad dreams for a week afterward, they were useful in furnishing a supply of warm air in the middle of the house, which could be admitted to the rooms by opening the doors; and they were simple, cheap, and easily kept in order. The successor of the hall stove was the brick-set furnace, many examples of which are still doing duty, after twenty years or more of useful existence. Although much more expensive than the hall stove, the brick-set furnace, placed in the cellar, had the advantage of being out of the way, while the tin pipes leading from it supplied the various rooms with warm air directly, and more satisfactorily than was possible where it was necessary to keep the doors open to let in warm air from the hall.

As usually built, the brick-set furnace consisted of an inclosure of brick walls, five or six feet square, covered with brickwork, laid on iron bars, which rested on the walls. The walls were usually made double, with an air-space four inches wide, to prevent loss of heat. The tin hot-air pipes were built through the brick covering, and the air was heated by a complication of corrugated or spiked surfaces and convoluted smoke-pipes inside. The earlier furnaces of this sort were made with heavy castings, and were very well designed for utilizing as much of the heat of the fuel as possible. Their capacity was, however, notwithstanding their bulk, comparatively small, and they were intended to be operated at a high temperature. With the wood-burning patterns, which were often used, the air delivered from the registers was frequently hot enough to set fire to a match, and a comparatively small proportion of air at this temperature was sufficient, mixed with the other air of a room, to bring the whole to the desired average. Very commonly, the air to supply the registers was taken directly from the cellar; but people who had whims on the subject of ventilation, sometimes insisted on having "air-drains" provided, by which a limited amount of fresh air was brought from the back yard, under the cellar floor, to the air-chamber of the furnace.

By degrees, architects and householders became dissatisfied with this form of heating-apparatus. The intense fire which it was necessary to keep up in such furnaces heated the cellar, notwithstanding the double walls of the setting; the mass of brickwork was accused of "absorbing" a quantity of heat which did not belong to it, but ought to be transmitted to the rooms above; and people began to find that their registers delivered to them "burnt smells," "carbonized dust," "scorched air," "carbonic oxide," and many other unpleasant things, in place of the "June atmosphere" which the furnace advertisements had led them to expect.

The first attempts at correcting the imperfections of the furnace air took the form of supplying it with moisture. Not only were water-pans inserted in the air-chamber of the furnace and kept sedulously filled with water, but dish-pans and tin wash-basins were to be seen standing on the registers in houses which aspired to the reputation of being the home of advanced intelligence, and huge sponges or towels soaked with water were often hung in the room to increase the evaporating surface. The care of all this apparatus was, however, a serious burden to the housekeeper, and the virulence of the air-moistening fever soon disappeared. Meanwhile the designers of furnaces, recognizing the advantages of increasing the supply of air and reducing the temperature proportionately, had modified their patterns, and, little by little, the modern type of hot-air furnace was evolved.

As now made, furnaces for central heating in dwelling-houses combine, in a greater or less degree, the best features of the various types which have preceded them. In the old brick-set furnaces, which contained a complication of heating surfaces, flues, pipes and domes, it was often found that a part of the pipes were useless, the smoke and heated gases taking a short cut through the nearest, and leaving the others cold. To prevent this the flues were, in certain cases, constricted, so as to force the smoke to divide itself among them; but this device had some practical inconveniences and was not always effective. At the same time that manufacturers were beginning to find defects in the multiplied radiating members of the old furnaces, a sudden outcry was raised against the use of cast-iron for heating, on the ground that carbonic oxide passed freely through its "pores" and affected the health of persons breathing air warmed by it. Although this notion was afterward completely disproved, it seized upon the popular imagination, and a demand arose for wrought-iron furnaces, with riveted joints, which would be impervious to noxious gases.

The first furnaces put upon the market in response to this demand consisted simply of a cast-iron fire-pot, lined with fire-brick, upon the top of which was set an inverted tub of boiler iron, with riveted joints, having a smoke-pipe issuing from it, the whole being inclosed in a casing of galvanized iron. Air was brought in between the fire-pot, with its boiler-iron "dome," and the galvanized-iron casing, and escaped, after warming itself by contact with the hot surfaces, through tin pipes carried from the top of the casing to the various rooms. Nothing could be simpler, and under suitable conditions this form was, and still is, very effective. It is, however, applicable, in its simplest form, only to small houses, or, at least, to houses which, like summer cottages, are provided with only a small number of registers. The quantity of air which can pass up between the casing and the dome of a furnace of this sort and become warmed by actual contact with the hot surfaces is very limited, and to try to distribute it among a large number of registers results only in disappointment, where the same furnace would supply a small number of registers with satisfaction to everybody concerned.

Although these very simple wrought-iron furnaces will supply two or three rooms with warm air with remarkable certainty and effectiveness and are less affected than those with more extended radiating-surface by sudden changes of wind, the comparative smallness of their capacity has led to modifications in them, for the sake of increasing the amount of air which can be warmed by passing through them, and thus enabling them to supply a larger number of rooms. In a good and inexpensive modern furnace this end is attained by giving the wrought-iron dome the form of a short telescope, the casing remaining cylindrical. With this arrangement a larger quantity of air can be admitted under the casing, as that which fails to come into actual contact with the surface of the dome or the casing accumulates in the space around the upper segment of the dome and either comes in contact there with the upper surfaces of the dome, or has time to mix with the hotter air which has been in such contact before issuing from the registers.

This modification, although it increases very sensibly the heating capacity of the furnace, without interfering with its good qualities, does not confer upon it the ability to supply hot air for a large house, and, for this purpose, the heating-surfaces must be again increased, so that more air can be brought in, with the certainty that none can escape through the tin pipes above without coming in actual contact with hot iron. After many experiments, furnace manufacturers have very generally adopted as the best type of furnace of moderate cost, for houses of comparatively limited size, a type in which a large fire-pot, roughly hemispherical in shape, is surmounted by a dome, and this again by a ring-shaped flue, through which the smoke and hot gases from the dome are conducted, and from which they escape to the chimney. In a furnace of this sort the air admitted between the fire-pot and the galvanized-iron casing, now generally substituted for the brick casing of the past generation, passes upward, warming itself by contact with the walls of the fire-pot and dome, and the inner surface of the casing, until it comes into collision with the annular flue, which extends out over the space in which the air has been traveling, almost to the casing. The interposition of this hot obstacle in the path of the air practically insures the collision with it, and consequent warming of whatever air may have escaped contact with the heated surfaces below; but, to make assurance still more sure, the air is then led, before it can reach the tin heating-pipes, laterally along the underside of the hot annular flue, to openings in the middle, through which it rises freely to the outlets provided for it. By this means a large amount of air is warmed with rapidity and certainty and is delivered very freely into the heating-pipes.

Although different makers adopt variations on this general type, some making the annular flue deep and some shallow, some constructing it of cast-iron and some of wrought-iron, some corrugating the dome and fire-pot to increase their heating-surface, and some leaving one or both of them smooth, the principle is the same in all, and the ease with which the annular flue is cleaned out, the evenness of distribution of the hot gases through it, and the certainty with which it intercepts and warms the air without too much checking its flow, make it, perhaps, the most valuable improvement ever introduced into furnaces for houses of moderate dimensions.

For very large houses, however, even greater air-warming capacity is required, and a furnace which would heat in a perfectly satisfactory manner eight or nine rooms may, if called upon to supply warm air to fifteen, fail to keep any of them comfortable, for the reason that the additional heating-pipes draw from the furnace a certain amount of warm air, which is chilled in its feeble progress through them and fails to produce any satisfactory effect in the rooms which they supply, at the same time that the subtraction of this warm air from the supply to the other rooms prevents them from being warmed. It is therefore essential, where a large house is to be heated, to provide for the introduction of an adequate supply of air. All this air must be warmed by actual contact with a heated surface before it enters the room, and for this purpose the furnace must present a large amount of heating-surface. It is useless to give a wide space between an ordinary furnace and the casing so that a large amount of air can pass, trusting to keeping up a hot fire to warm it all, the result of this being simply to supply hot air to the registers most favorably situated and cold air to the others.

For large furnaces, therefore, a certain complication of heating parts is necessary, in order to extend them sufficiently to intercept and heat a large volume of air. In several excellent furnaces large pipes or flues, either straight or curved, are provided, passing through the fire-dome and opening at top and bottom into the air-chamber. The air from the lower part of the air-chamber passes up through these flues and issues from the top, heated by its journey through and over the fire, and joins in the upper part of the air-chamber the portion which has ascended between the furnace and the casing. The capacity of the furnace for transmitting air is immensely increased in this way, and the portion which passes, by means of the air-flues, through the fire itself is quite as effectually warmed as that which passes through the narrow space between the fire-dome and the casing.

A variation of this type is made by building up the fire-pot and dome of cast sections, which inclose between them, when put together, vertical air-flues, opening at top and bottom into the air-chamber, as in the case just described, and serving in the same way to add to the volume of air passing up outside the fire-dome a large additional quantity, passing through the fire-dome, in close contact with the fire. As the upward current through these strongly-heated flues is very rapid, the sides of them are formed with horizontal waves, or corrugations, so that the air will not only be held longer in contact with the hot iron, but will be thrown with a certain force against it, this being found to favor the heating effect.

A pattern of furnace somewhat similar in appearance to those with air-flues running through the fire-pot has a number of vertical smoke-flues carried down through the air-chamber, the smoke being drawn out from them either through an annular flue at the bottom, communicating with the smoke-pipe, or through a similar annular flue at the top. If such furnaces are well managed, and if the conditions are favorable, they are powerful heaters; but if the chimney draught is poor or the fire burns sluggishly or unevenly, the smoke and hot gases may find their way out through one or two of

CHOIR SCREEN: CATHEDRAL OF NOTRE DAME, RODEZ, AVEYRON, FRANCE.

ROOD AND CHAPEL SCREENS.—34.



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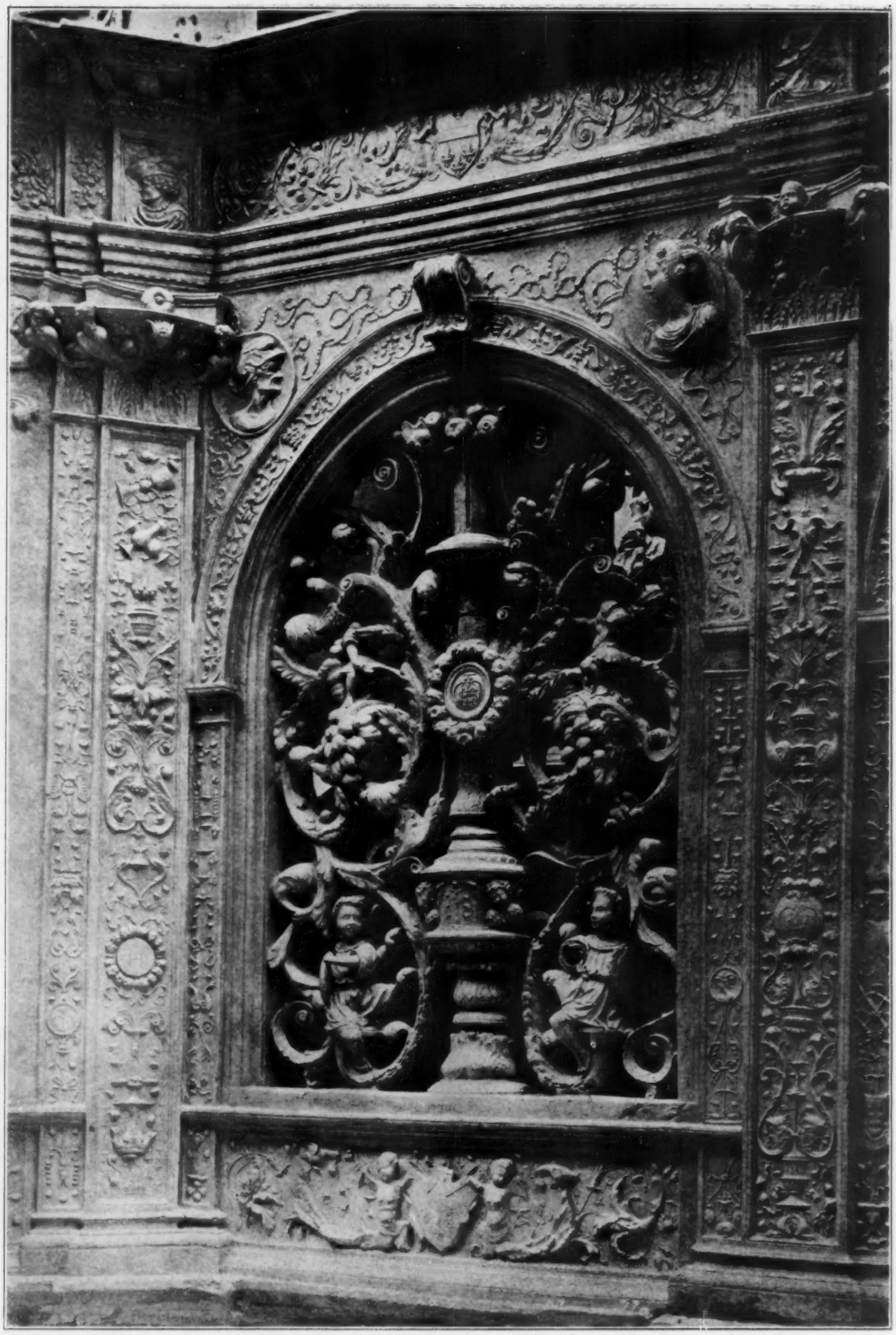

DETAIL: CHOIR SCREEN, CATHEDRAL OF NOTRE DAME, RODEZ, FRANCE.

ROOD AND CHAPEL SCREENS.—35.



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DETAIL OF CHOIR SCREEN: CATHEDRAL OF NOTRE DAME, RODEZ, AVEYRON, FRANCE.

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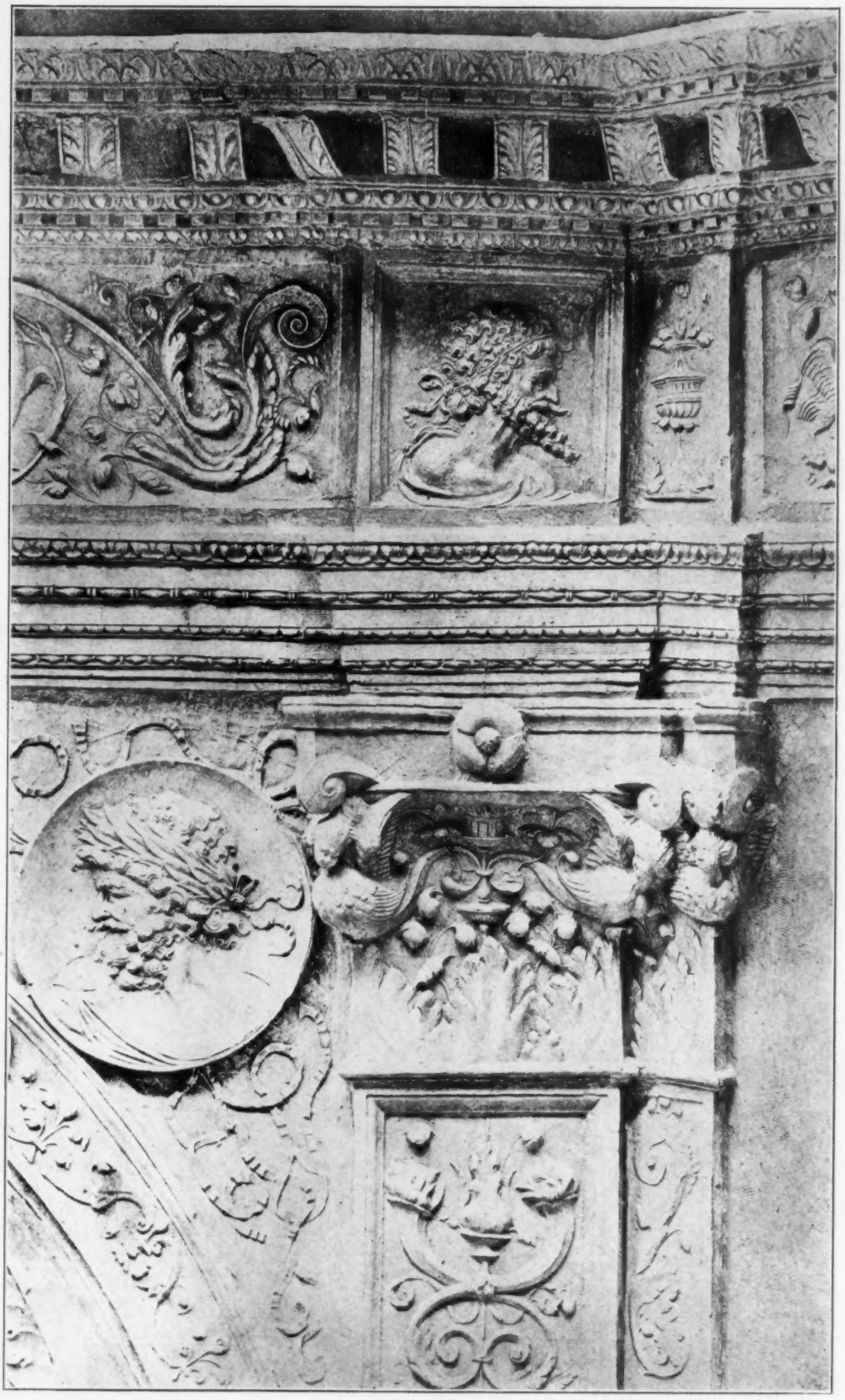

DETAIL OF CHOIR SCREEN: CATHEDRAL OF NOTRE DAME, RODEZ, FRANCE.

ROOD AND CHAPEL SCREENS.—37.



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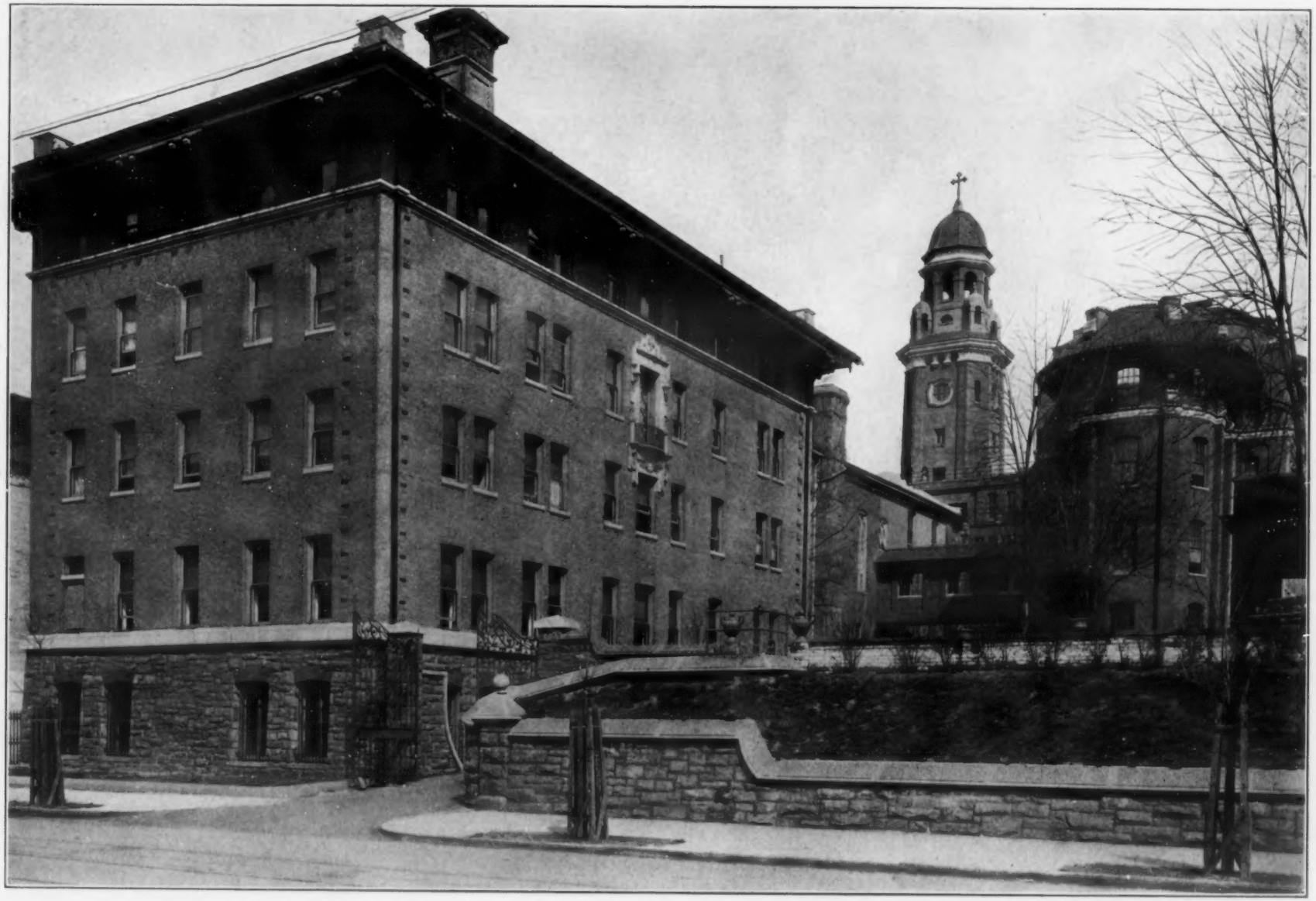

REAR VIEW: PROVIDENCE HOSPITAL, WASHINGTON, D. C.

Wood, Donn & Deming, Architects.



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THE TOWER: PROVIDENCE HOSPITAL, WASHINGTON, D. C.

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PRIESTS' HOUSE FOR THE PARISH OF ST. JAMES, JAY STREET, BROOKLYN, N. Y.

George H. Streeton, Architect.



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PROVIDENCE HOSPITAL, D STREET, COR. 2D, S. E., WASHINGTON, D. C.

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SCREEN IN THE CATHEDRAL OF ST. ÉTIENNE, LIMOGES, HAUTE-VIENNE, FRANCE.

ROOD AND CHAPEL SCREENS.—38.



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DETAILS OF SCREEN: CATHEDRAL OF ST. ÉTIENNE, LIMOGES, HAUTE-VIENNE, FRANCE.

ROOD AND CHAPEL SCREENS.—39.



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DETAIL OF SCREEN: CATHEDRAL OF ST. ÉTIENNE, LIMOGES, FRANCE.

ROOD AND CHAPEL SCREENS.—40.



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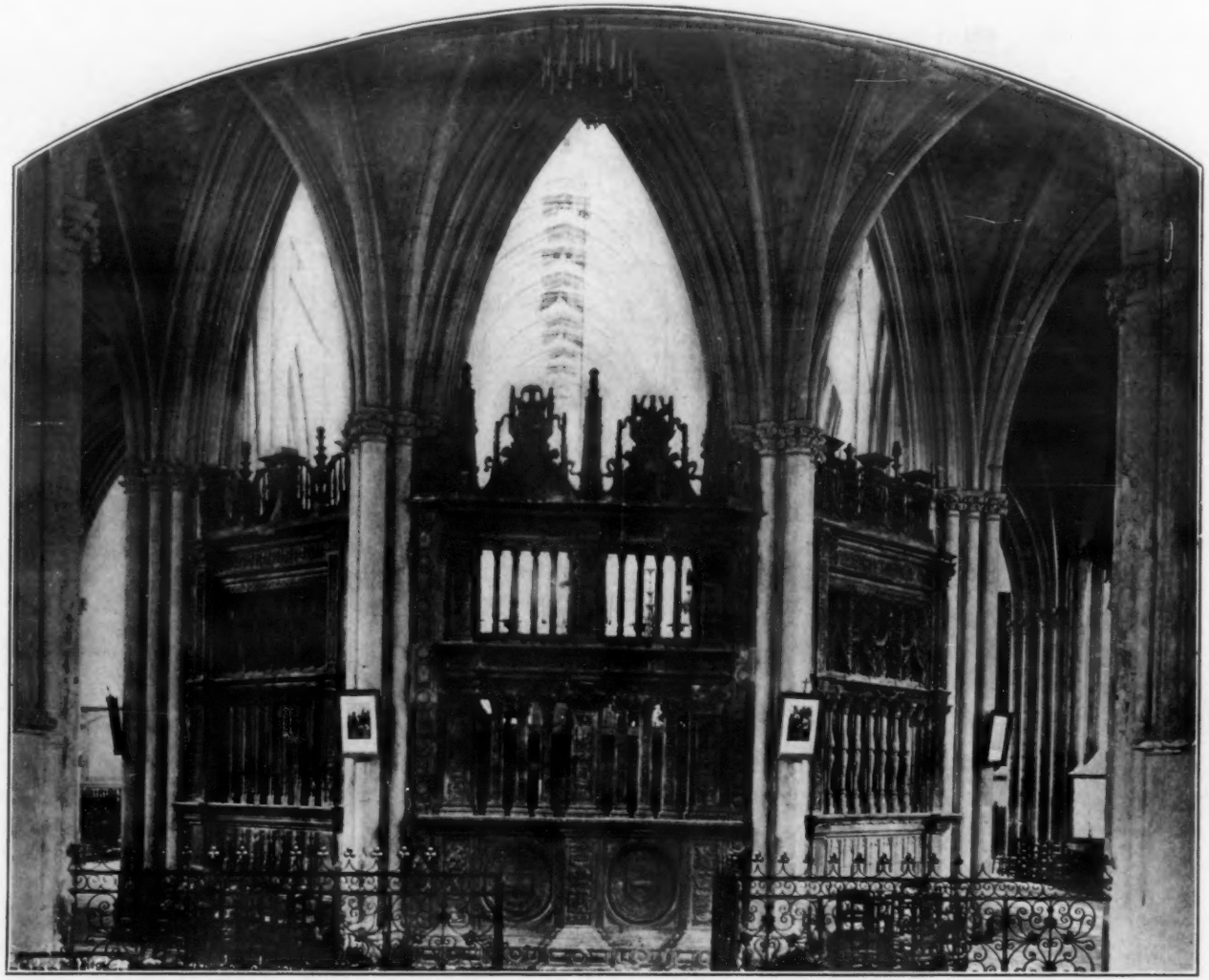

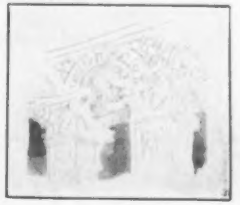

CHOIR SCREEN: VENDÔME, LOIR-ET-CHER, FRANCE.

ROOD AND CHAPEL SCREENS.—41.



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the flues, leaving the others cold, so that only the tin pipes from the side of the furnace over the active flues will supply warm air to their registers, the registers supplied from the other side of the furnace being cold.

T. M. Clark.

*(To be continued.)*

## SWEDEN—III.

THE seventeenth century inaugurated by Gustavus II. Adolphus is coincident with the Baroque. It was then that Sweden came into close contact with the rest of Europe. Her victorious generals returned from the wars in Germany anxious to emulate what they had seen of art and refinement in the Southland. Sweden owes much to Queen Christina in this one respect that she favored French and Italian art, and this was a factor in preventing Swedish building from sinking down to the level of the heavy and labored German Baroque. Between their many wars the powerful nobility became eagerly engrossed in the building of châteaux and manor-houses, embellishing them richly within and setting them off with parks and formal gardens.

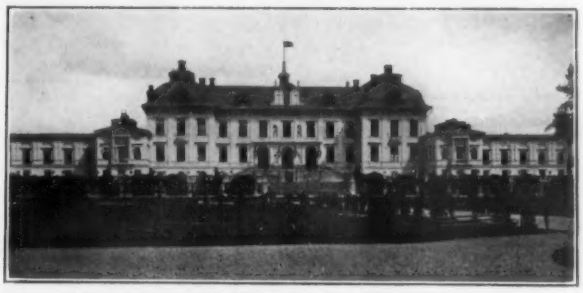
These structures are nearly always characterized by the simplicity of their mass and outline. The vagaries of the Baroque did not thrive. There is to-day a flavor of worthy dignity, and often of unassuming grandiosity, comparable with the best work of our own colonial period. The roof-lines are always conspicuous, and the gambrel form was much used for the smaller structure and treated in a rational manner. A gambrel story is better suited to a cold climate with its cool summers than it is to a scorching sun, for the rooms are too close to the roof. In fact, the gambrel roof was so much thought of that in some sections it marked the homes of nobility, none other being permitted to employ this style of roof. Tile was the universal roofing material.

A typical plan was soon evolved for the manor-house. It consisted of the *"corps de logis,"* the main structure, approached through an imposing double or quadruple line of trees. On either side, but not connected with it, were lower buildings for the inspector and superintendent of the estate. These formed a court, open on one side, with a large circle for the driveway around a well-kept flower bed. On the other side of the main structure the flower-garden and park extended quite often down to the water's edge. In a way one is reminded of our Southern Colonial style of building, a main structure and low wings connected with the central part.

ROYAL CHÂTEAU NEAR STOCKHOLM.

The architect of this period is Nikodemus Tessin, the elder, who came to Sweden from North Germany. He is, however, nearly eclipsed by the brilliant performances of his son, the architect of the Royal Palace at Stockholm, but a glance at the photograph of the Palace Drottningholm shows that the elder architect was also a man of independent thought and vigorous mind. In this palace he has left a dignified monument, where the mass is most happily composed and, notably, the roof-lines are strong and graceful. The grand staircase is very successful and imposing. This Tessin has a long list of châteaux and manor-houses to his credit, in which he set a high mark for his gifted son. Of these only one other "Skoploster" is illustrated. It was he who introduced the domical church plan with a central arrangement. Up to his time the Gothic plan with classic motives had persisted. Builders found it difficult to break away from the long-aisled church plan.

The French architect de la Valleé and his son erected the simple and dignified Riddarhuset (House of Lords) as a monument to their taste. In this structure the small building to the left is balanced by a similar one to the right, a counterpart of the customary manor-house arrangement already referred to.



ROYAL CHÂTEAU OF DROTTNINGHOLM, SWEDEN. N. TESSIN, SR., ARCHITECT.

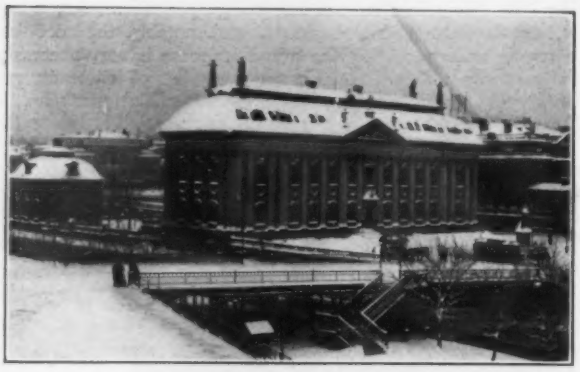
The greatest monument of this period is the Palace of Stockholm, which was begun quite near the end of the era of Sweden's political power, its construction being handicapped and seriously retarded by the subsequent period of depression and weakness. It is certainly a noble monument, with dignified lines. The setting is superb, on an island in Mälären, high enough to dominate. The low wings give it variety, without disturbing the balance or unity. From the day of its erection, down to our own time, it has been admired by native and traveler alike. Tessin was invited by three foreign kings to prepare plans for palaces. Added to his natural ability was his careful training, the very best that the country could give in his youth, supplemented by six years of study in Italy, two in France, and a special trip of thirteen months, preliminary to the building of the palace.

A TYPICAL COUNTRY-SEAT, SWEDEN.

To us of America, with our colonial Wren churches and spires, it is of special interest to see how a contemporary of Wren's tried to build a Gothic spire without Gothic motives. In the views of the Cathedral of Vesteras is seen a spire by this Tessin, a fine, bold composition in every way, very unlike the English architect's work, but, it may be added, far more suitable to the Romanesque Gothic church it surmounts than it would be possible to imagine a many-storied affair after Wren. There is not much to it, one might say—a truncated pyramid, elongated, a few bold mouldings at its base, and the four pedimented

clock-faces. Oh, yes, the four bull'seye-windows half way up, for without them the obelisk would look dull and meaningless.

Tessin was Swedish-born, the authorities to the contrary notwithstanding. His father came from Germany, his mother was a woman of the Swedish middle-class.



HOUSE OF LORDS (RIDDARHUSET), STOCKHOLM, LA VALLÉE ET FILS, ARCHITECTS, 1648-70.

It is only natural to find during the eighteenth century building almost at a standstill. There is but little to say of it more than that what was done, being mostly manor-houses, was done with good taste, being only superficially influenced by the frivolities of the Baroque and Rococo. Toward the close of the century Sweden entered its most brilliant literary and scientific period, which lasted far into the nineteenth century. But the arts were not cultivated with any great success. In this Sweden shared the fate of Europe, and of America, too, for that matter. Architecture, painting and sculpture were at the very nadir of depression and suppression. When the century had passed its fiftieth year, however, a change set in for the better. It was the artist and architect Prof. F. W. Scholander who represents the new movement. All this, however, belongs strictly to our own time. The

HISTORICAL MUSEUM, STOCKHOLM.

serious and high-class work done by the architects now in the prime of their productive power need not fear a comparison with the past on the one hand or the present on the other. The Swedish architects of to-day give their world-renowned brother artists, the Swedish painters and sculptors, a warm race in the struggle for permanent fame.

OLOF Z. CERVIN.

## EXPLOSIVE VAPORS AND DUSTS.[1]

THE use of petrol or petroleum spirit in large quantities for oil motors and the necessity for storing it in bulk have of late given rise to a danger which before only existed to a limited extent.

Petrol is the first distillate from the crude oil as it comes from the oil well, and largely consists of pentane, $C_5 H_{12}$, and hexane, $C_6 H_{14}$, the first liquid members of the great paraffin group of hydrocarbons. This liquid is volatile even below the freezing point, and a pint of it poured on a level surface will cover about 80 square feet with an inflammable vapor, through which on coming in contact with a light a flame will spread. One pint of the liquid will also give enough vapor to render 100 cubic feet of air highly explosive.

These light oils have a wonderful penetrative power, and it is a matter of considerable difficulty to get vessels made for commercial purposes sufficiently vapor-tight to resist the insidious creeping of petroleum spirit. The result is that in stores, cellars, and other places where vessels containing such spirit are kept, slight leakage and evaporation into the air are constantly occurring, and as the evaporation of one volume of liquid petroleum spirit would render 5,000 volumes of air strongly explosive, it is clear that special precautions must be taken in dealing with the storage and use of such spirit.

The temperature needed for the ignition of explosive mixtures of petroleum vapor and air is comparatively high, and experiments made by Colonel Majendie, Sir Boverton Redwood, and Dr. Dupré showed that such mixtures were not ignited by the glowing spark on a splint of wood, a red-hot coal which had ceased to flame, or a shower of sparks from a flint and steel, and that it needed a temperature of platinum wire raised nearly to a white heat before explosion took place, that is, about 1,400° C.

One of the greatest dangers with the vapor of volatile hydrocarbons is that the great weight of the vapor as compared with air will cause it to creep along surfaces for very long distances, and then on reaching a light the flame flashes back along the vapor to the source from which it sprang.

It may be accepted that the transport and storage of refined lamp oils and residuum are practically free from danger, the only point to be guarded against being the ignition of the liquids in volume during fires, while the real dangers to be guarded against are to be found in the transport and storage of crude oils containing highly volatile constituents, and petroleum spirit.

In all confined spaces used for the storage of such material, the adoption of the safety-lamp, and the constant testing of the atmosphere by the beautiful method devised by Dr. Clowes and Sir Boverton Redwood would go far towards insuring safety. . . .

When it became clearly evident that the development of the carriage of crude petroleum in bulk, and the carriage and storage of petroleum spirit necessitated analysing the atmosphere in tanks and stores, this method of testing naturally suggested itself, and Sir Boverton Redwood succeeded in devising a special modification of the lamp, and also an apparatus for collecting samples of the atmosphere in which petroleum vapor was suspected, and testing them under uniform conditions.

The apparatus consists of the lamp, the cylinder of compressed hydrogen, and a sampling vessel. The base of the lamp is fitted with two inlet-tubes, one for the sample of atmosphere, and the other for the hydrogen, the latter being provided with regulating tap and jet. Immediately above the tube for the inlet of the vapor-laden sample is a series of baffles, on the top of which are three discs of very fine wire gauze, which regulate the flow of gas and prevent any flashing back of the flame into the sampling vessel. The hydrogen jet is partially inclosed by a metal tube, the front of which is removed, and over this slides a chimney partly of metal and partly of glass, the metallic portion being blackened inside. In the window are lines corresponding to various heights of flame-caps.

The collecting vessel consists of a compression pump fitted with a metallic piston fixed inside a strong metal cylinder, which is furnished with a pressure-gauge and valve, and also has connections and taps for collecting and delivering the sample. About thirty strokes of the pump suffice to charge the cylinder to a pressure of 30 lbs. to the square inch, when it will contain one-third of a cubic foot of the atmosphere sampled.

In using the apparatus the hydrogen cylinder is connected to the lamp, and, the sliding chimney being raised, the hydrogen is turned on and lighted. The supply is adjusted to give a flame of slightly more than 10 millimetres in length, and the apparatus is left for a few minutes to warm up so as to drive off any condensed moisture from the surface of the chimney. The collecting vessel is attached to the other inlet of the lamp, the chimney is closed completely, and the hydrogen flame finely adjusted by the regulating valve till the tip of the flame is just hidden when the eye of the operator is on a level with the bottom of the window.

[1] Extracts from a lecture by V. B. Lewis, Professor at the Royal Naval College, Greenwich, before the Society of Arts.

The lamp and head of the operator are then covered with a light-tight cloth, and the tap of the collecting cylinder turned on. Even with a proportion of vapor that is too small to give an explosive atmosphere, a cap of a greyish-blue appears on the flame. As the proportion of vapor increases, the flame-cap becomes better defined, followed by considerable enlargement of the cap, this feature occurring before the atmosphere contains sufficient vapor to render it inflammable.

When petroleum spirit has once taken fire it is most difficult to deal with, as, being far lighter than water, even when great volumes are poured upon the fire, the spirit rises to the surface and continues burning, while the vapor given off prevents any cooling of the liquid from proving efficacious. Chemical extincteurs and gases like carbon dioxide and sulphur dioxide can only act upon it if the fire be in a very confined space, as the updraught caused by the fierce flame sweeps them away and sucks in air to the burning mass. Sand or fine mould is the best thing for extinguishing a petrol fire, and if this is not at hand in sufficient quantity the next best thing is to let the fire burn itself out, and devote one's whole attention to protecting surrounding property.

The formation of any large quantity of organic dust floating in the air is a very distinct danger, as not only is dust liable to become pyrophoric in its nature when lightly charred on hot-water pipes or heating apparatus, but when suspended in quantity in air gives an explosive atmosphere through which a flame will flash from an exposed light for great distances. Fires frequently occur in flour-mills and other places where finely divided combustible material is liable to become mixed with the air.

All finely divided particles have the power of occluding or taking up oxygen from the air, and with many forms of combustible dust this has been found to take place to such an extent that a flame will flash through it even when the dust is suspended in an atmosphere that would not support ordinary combustion. It can also be proved that if a trace of an inflammable gas be present in air, although the quantity may be so small as to be far below the explosive point, a small quantity of dust suspended in the air will make it at once violently explosive. This is a very great danger in coal mines, where a small trace of fire-damp may be made actively dangerous by a quantity of dust raised during blasting operations, while an escape of gas in a flour-mill which might be so small as not to be detected by the nose, would make an atmosphere containing flour-dust actively explosive.

Another very dangerous form of material for storage is collodion, which during the past few years has been extensively used for the manufacture of imitation amber, tortoise-shell, ivory, and even artificial silk. . . .

The danger of collodion goods is the low point at which they ignite and burn with great fierceness, the ignition point sometimes being as low as 150° C. (302° F.), and rarely exceeding 200° C. (392° F.). When the collodion was used for making a fabric for dresses, such as artificial silk, the danger became so grave that for this purpose at any rate after manufacture, the collodion had to be denitrated by treatment with some body like ammonium sulphide, which reconverted the explosive nitrocellulose back into the harmless cellulose.

The collodion cotton prepared for making the solutions and emulsions employed in these manufactures owes its great danger to the fact that the cotton fibres consist of minute tubes, which retain with great pertinacity traces of the acids used in the nitration, and unless this acid be entirely eliminated, the nitro-cotton during storage undergoes decompositions, which soon emit sufficient heat to reach its low ignition point.

In the mixed storage of various substances many unexpected dangers arise, especially if there be present among the materials oxidizing agents, that is, bodies rich in loosely-held oxygen, and a very considerable amount of chemical knowledge is necessary to gauge whether or no danger arises from the simplest bodies, as, should fracture of a bottle or package arise and bring about a mixture, unexpected phenomena are developed. For example, it is not unusual to find in a dry-goods store packages containing crystals of potassium permanganate, which, dissolved in water, give a very valuable disinfecting liquid—Condy's fluid; while glycerine, so frequently used for chapped hands and as an emollient for the skin, would not be a substance which to an ordinary man would suggest any degree of danger, but, should a bottle of glycerine upon the shelf of a store be cracked, or some of the glycerine be spilt during transfer to another vessel, and drip on a cask or package containing potassium permanganate, excessively fierce combustion would be at once created, while even water itself coming in contact with such substances as potassium or sodium gives rise to violent combustion.

## RESISTANCE OF BUILDING STONES TO FROST.

ATMOSPHERIC variations exercise so prejudicial an effect upon certain building-stones that the opening of a new quarry is a matter of considerable importance, for architects and engineers do not adopt materials from fresh sources without being fully satisfied as to their reliability. The prudence of this course is further justified by the fact that cases have occurred where builders have been compelled to suspend operations because they have been insufficiently informed as to the resistance to frost of the stone employed. Therefore, it must be agreed that the resistance of structural materials to frost is a question of primary importance.

During a long period the Brard process was the only means by which account could be taken of the characteristic of stone to which attention is here directed. Although not enabling the problem to be solved in a direct and absolute manner, it furnished approximate results that were formerly accepted as sufficiently satisfactory.

This process was conducted by immersing a fragment of stone with sharp edges, or preferably a cube measuring a few centimetres across, in a cold saturated solution of sodium sulphate. The solution was then boiled for thirty minutes, after which the stone was removed and exposed for eight to ten days in a chamber, where a moderate and constant temperature was maintained. At the end of this period the specimen was examined. If it remained intact, its resistance to frost was considered to be satisfactory. On the other hand, if the edges had lost their sharpness, showing splinters that appeared to be on the point of separation and that could be carried away by a jet of water from a wash-bottle, it was regarded as liable to injury by frost.

Some modifications were made in this mode of operation by MM. Vicat, Héricart de Thury, and Husson, who attempted to render the details of execution more methodical. These scientists recommended that observations should be made at the end of pre-determined periods, and that the particles carried away by washing after each period should be weighed for purposes of comparison.

In spite of these modifications the process still presented the grave defect of indicating materials as liable to injury by frost which were not so affected, the fact being that much of the deterioration observed was caused by unduly protracted treatment.

M. Braun then attacked the problem in a different manner. He proposed to characterize as liable to injury by frost all stones whose resistance to tension is less than the expansive force of water at the moment of congelation. This idea was certainly rational, since it is precisely the increased volume of water in passing from the liquid to the solid state that causes the disintegration of stone under the influence of frost. But the absence of exact experimental methods and the inadequacy of the results obtained caused M. Braun to abandon his process.

In the present day the resistance of stone to frost is determined by laboratory tests based upon successive and rapid variations of temperature.

The specimen of stone selected for examination is cut in the form of a 7-centimetre cube, which is submerged in a vessel containing water. The vessel is placed under the receiver of an air-pump, air being exhausted until a partial vacuum of 10 in. is obtained. The quantity of water absorbed is naturally governed by the porosity of the material. If the stone is not to be employed under water it is sufficient to accept the natural absorption of the cube after immersion in water for twenty-four hours. After saturation the cube is introduced into an apparatus containing a freezing mixture capable of maintaining during several hours the temperature of from —20 deg. to —15 deg. C. After being exposed for four hours to the temperature of, say —15 deg. C. the cube is removed from the apparatus and immersed in distilled water, or, in default, in drinking water, of which the temperature is +15 deg. C. The specimen is then examined. In cases where distilled water is employed for washing, the water is collected and examined for soluble salts.

Sometimes the tests are completed by determining the compressive strength of the stone under examination, the specimens being dried after twenty-five successive freezings and thawings, and by comparison of the resistance with that of the original stone tested in the dry state and after the absorption of water to the point of saturation.—*Prof. J. Malette in "The Builder."*

# ILLUSTRATIONS

ROOD AND CHAPEL SCREENS: PLATES 34-41.

THE details of the screens at Fécamp—illustrated in the last number of "Rood Screens"—preserved more of the Gothic character in the detail of their composition than any of the screens of the Early Renaissance save, perhaps, the choir screen at Vendôme.

Here at Vendôme the carved pinnacles and gables ornamenting the choir screen give us an idea of the now destroyed terminals of the Fécamp examples. Pinnacles and gables and flying-buttresses, Gothic in form and detail, are combined with Renaissance balusters and colonnettes in so complex a manner it would require the most vivid imagination to restore the upper part of the Fécamp screens from the small traces left us.

As a composition the Vendôme example is not successful, the horizontal cornices dividing the height into equal parts. On the sides, however, this is not so strongly felt and the upper division is treated with Flamboyant tracery intersecting the colonnade treatment. The purist has strong grounds for condemning the work of the early Renaissance with its mixture of styles, but there is a romantic quality in every example which fascinates one.

This attraction is strongly felt on the Rood-loft at Limoges. It originally divided the choir and nave, but was removed and rebuilt in front of a side bay. The composition is Gothic, but only on the remains of the groins can the Gothic core be detected. Every member is covered with a Renaissance veil that is almost transparent one might say. Canopies, drops, corbels, all Gothic in composition, are ornamented with Renaissance columns, pilasters, niches, keys, consoles. Incredible skill in execution is found in every part. The minute free-standing columns in some places are scarcely thicker than a lead pencil. A study of the balustrade here illustrated, which is not over three feet high, will give one an idea of the minute scale of the ornament. An excellent cast of this screen has been set up in the Trocadéro Museum in Paris.

At Rodez a more sedate composition has been attempted and richness of effect tried for in a multiplicity of detail covering every part. The penetrated stonework in the opening and in the tympanum over the door is worthy of study and possesses a crispness and freshness seldom seen outside of Gothic work.

The irregular shape of the arches over the door and window seems to indicate the designer could not force himself far from the Gothic pointed arch. A cast of this screen also is in the Trocadéro, and from this our illustrations have been taken.

W. T. P.

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# NOTES AND CLIPPINGS

THE RESTORATION OF PETERBOROUGH CATHEDRAL.—The restoration of the north transept of Peterborough Cathedral was begun a few weeks ago. With this undertaking the work of restoration commenced in the "80's" will have been completed. During the last twenty-five years between £80,000 and £100,000 have been spent on the restoration of the cathedral. The architect is Mr. G. F. Bodley, R.A. The north wall leans a good deal, but Mr. Bodley thinks the settlement took place a considerable time ago, and that the masonry has now got its bearing. The cracks and displacement require to be carefully treated. Mr. Bodley says:—"The building must obviously be accepted as an ancient one, and all the old work that it is possible to retain should be retained. But all that adds to the durability of the fabric and to its greater preservation should be certainly carried out as soon as is possible, and any glaring defect should be made good."—*The Building News.*

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FILTRATION AT WASHINGTON A FAILURE.—The citizens of the District of Columbia are ordered to boil their drinking water. Considering that only about a year ago the installation of a filtration plant was completed at a cost to the National Government of more than seven million dollars, the order is surprising and its explanation is calculated to disturb the people in communities where filter-beds are depended upon for a pure supply. Malarial and typhoid fever have long been prevalent among the users of Potomac river water, and, contrary to all reasonable expectations, one of the most perfect filtration plants in the world is now found to be inefficient to remove the germs completely. Though it otherwise cleanses and clarifies the water of its more obvious offenses, it is frankly conceded that the plant is a failure for the accomplishment of its chief purpose. Probably, or at least it may be hoped, the conditions were initially of a kind less susceptible to improvement than those existing at the source of the water-supply of cities like Providence, for instance, where much consideration was given to the selection of a filter system before the adoption of the sand beds. Nevertheless, in the course of the controversy that always develops whenever a community takes up the subject, the advocates of mechanical or chemical filtration will hardly neglect the extraordinary opportunity to support their claims afforded by the experience in the practical service of the model installation provided for the city of Washington.—*New York Evening Post.*

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FIRE-KILLED TIMBER.—Although it has been known for a number of years that fire-killed timber has a considerable value in railroad and mining operations in Colorado, it has been brought out only recently, says *Wood Craft,* that a wide number of uses are open for this timber, and that in certain respects it has actual advantages over green wood. These facts are deduced from a study of conditions on the Pikes Peak Forest Reserve, where the ravages of fire have been particularly widespread and destructive. In many instances the burned timber is the only kind available at a particular point. So for timbers and ties, in mines and railings, the dead material has been used for many years. The species used are red fir, yellow pine, lodgepole pine, limber pine, range pine, pinion, Engelmann spruce, and blue spruce. Of these the pines, red fir, and Engelmann spruce furnish the bulk of the material. Time elapsed since burning seems to make no great difference in the value of the wood. The timber used has been burned all the way from three to fifty-five years. The amount of this timber which has been used is very considerable. There has been one sale from the reserve for box boards and one for telephone poles; but the three main uses continue to be for mine timbers, railroad ties, and firewood. Red fir is preferred for railroad ties, then yellow pine, limber pine, and range pine. White pine has been objected to because of its lack of durability; but it is now taken in many places. At Rosemont, Col., burned timber of all kinds is made into ties, some of the material having been burned fifty years ago. It is asserted that dry ties last as long as green ties, and in many cases longer. Dry ties hold a spike well, and a tie plate does not cut into the wood so seriously as it does in the case of a green tie. Engelmann spruce is as good as the other species, as far as mechanical wear is concerned; but it decays much quicker, and so should be given a preservative treatment. Burned timber was first used for boxes by the Denver Crate and Box Company in February, 1903, the species used being Engelmann spruce and lodgepole pine, with some red fir and limber pine. The material used had been burned from one and one-half to four years. The Engelmann spruce was excellent, and the lodgepole pine also gave good results. The fire seasoning had driven the odor out of the pine, so that it could be used for packing accounts; also on account of the perfect seasoning the boxes remained tight when put up, and therefore sold better than green boxes. For mine timbers all species are used, if of the requisite size. Dry timber is preferred because of its lightness, durability, and stiffness, all principally due to its better seasoning. For many purposes fire-killed timber should be preferred to green timber, because it is so well seasoned. This seasoning makes it more durable than green timber, and also makes it lighter, so that its cost of transportation is appreciably less, and it is therefore available, not only for numerous local uses, but for shipping long distances.

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## PROPOSALS.

Treasury Department, Office of the Supervising Architect, Washington, D. C., September 17, 1906.—Sealed proposals will be received at this office until 3 o'clock P. M., on the 20th day of October, 1906, and then opened for the construction, complete (except heating, elevator, electric conduits and wiring), of the Contagious Disease Hospital, U. S. Immigrant Station, Ellis Island, N. Y., in accordance with drawings and specifications, copies of which may be had at this office or at the office of the Chief Engineer and Superintendent, U. S. Public Buildings, New York City, N. Y., at the discretion of the Supervising Architect.—James Knox Taylor, Supervising Architect. (1605-1606)

Treasury Department, Office of the Supervising Architect, Washington, D. C., September 20th, 1906. Sealed proposals will be received at this office until 3 o'clock P. M. on the 11th day of October, 1906, and then opened for the construction (including approaches) of the Commemorative Monument at Jamestown, Virginia, in accordance with the drawings and specification, copies of which may be had at this office, at the discretion of the Supervising Architect.—James Knox Taylor, Supervising Architect. (1605-1606)

Treasury Department, Office of the Supervising Architect, Washington, D. C., September 24, 1906.—Sealed proposals will be received at this office until 3 o'clock p. m. on the 15th day of October, 1906, and then opened, for the installation of a hydraulic mail lift in the U. S. Post Office and Court House, Kansas City, Missouri, in accordance with the drawing and specification, copies of which may be obtained at this office or at the office of the Custodian at Kansas City, Mo., at the discretion of the Supervising Architect.—James Knox Taylor, Supervising Architect. (1606, 1607)

Treasury Department, Office of the Supervising Architect, Washington, D. C., September 26, 1906.—Sealed proposals will be received at this office until 3 o'clock p. m. on the 22nd day of October, 1906, and then opened, for the installation of a conduit and electric wiring system for the U. S. Post Office and Court House at Sherman, Texas, in accordance with drawings and specification, copies of which may be had at this office, or at the office of the Superintendent of Construction, Sherman, Texas, at the discretion of the Supervising Architect.—James Knox Taylor, Supervising Architect. (1606, 1607)

Treasury Department, Office of the Supervising Architect, Washington, D. C., September 26, 1906.—Sealed proposals will be received at this office until 3 o'clock p. m. on the 17th day of October, 1906, and then opened, for the installation of an electric passenger elevator in the U. S. Post Office and Court House, Fargo, North Dakota, in accordance with the drawing and specification, copies of which may be obtained at this office at the discretion of the Supervising Architect.—James Knox Taylor, Superyising Architect. (1606, 1607)


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MARYVILLE, TENN.—Clay Cunningham, county clerk, writes that bids have not yet been asked for the proposed new courthouse, to cost between $25,000 and $50,000.

MERRILL, WIS.—Plans have been prepared by Architect Van Ryn & De Gelleke, 53-54 211 Grand Avenue, Milwaukee, for a 3-story clubhouse, 54 x 104.

MEXICO CITY, MEX.—Barber & Kluttz, of Louisville, Ky., it is stated, have been commissioned to prepare plans for a residence and barns to be erected in Mexico City for H. L. Perkins, of the Kansas City, Galveston & Mexico Railway. The cost will be about $75,000.

MILWAUKEE, WIS.—It is reported that a $150,000 addition will be built to the factory of the F. Mayer Boot and Shoe Company on First Street between Walnut and Sherman.

It is stated that Romadka Brothers will erect a new factory at Thirty-second and Center Streets. Cost, $70,000.

It is stated that plans for a brick restaurant building to be erected at Detroit Street and Broadway, costing about $50,000 are being prepared by August Uihlein, 831 Wells building.

Announcement has been made that plans have been completed for a 4-story brick building which is to be erected for Edw. Schuster & Co., on Garfield Avenue and Third Street at a cost of about $140,000.

The State Board of Agriculture, it is stated, is contemplating making improvements to the State Fair grounds, at a cost of about $100,000, which will include the erecting of a machinery hall, additional cattle stables, a hospital, etc.

MINNEAPOLIS, MINN.—The Curtis Hotel Company, it is reported, intends erecting an apartment hotel at Tenth Street and Third Avenue S., to cost about $800,000.

MT. VERNON, N. Y.—The Seaboard National Bank, in conjunction with the Columbia Trust Company, has bought the southwest corner of First Street and Second Avenue, Mount Vernon, 50 x 175, and will build on the plot a bank and storage warehouse.

NEWARK, N. J.—It is reported that the Murphy Varnish Company will make an extensive addition to its present plant in Chestnut Street, to cost $100,000; architect, Howard Chapman.

NEW YORK, N. Y.—Clinton & Russell, 32 Nassau Street, it is stated, have been instructed to prepare plans for a building to be erected at 160 Bway, for the Lawyers' Title Insurance & Trust Company.

A permit has been granted for a 2-story brick bank building, to be erected at Have-

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meyer and S. Fifth Streets, to cost $60,000. Dime Savings Bank, owner; Helmle & Huberty, 190 Montague Street, are the architects.

McKim, Mead & White, 160 Fifth Avenue, it is stated, have been commissioned to prepare plans for a building to be erected at Broadway and Exchange Place for the Knickerbocker Trust Company.

Michael Cusack has purchased a plot, 49 x 198 feet, southwest corner of Prospect Avenue and One Hundred and Sixty-first Street, Bronx, the site of the old Methodist Episcopal Church, on which he will erect a 6-story high-class flat building.

Plans have been filed with the Building Superintendent for the 3-story building, 80 x 100 feet, which is to be erected at 126-128 East One Hundred and Twenty-fifth Street, for the Harlem Savings Bank. Bannister & Schnell are the architects.

The St. Edmunds Roman Catholic Church, it is stated, will erect a reinforced-concrete church at Morris Avenue and One Hundred and Seventy-seventh Street, at a cost of $75,000.

The Seventy-sixth Street Company will build a 12-story fireproof apartment house at West End Avenue and Seventy-sixth Street. It is to be 79 x 100 feet. Estimated cost, $425,000.

The First German Presbyterian Church is going to build a new church at a cost of $100,000. It is to be located on Leonard Street, near Stagg Street.

Townsend, Steindler & Haskell, 29 East Nineteenth Street, are architects for a 6-story loft building to be erected at 36-38 West Thirty-seventh Street for T. R. Boll. Estimated cost $200,000.

Mason & Ehrman, it is reported, propose to build a warehouse to be six stories high and 100 x 100 feet, at Fifth and Everett Streets. Whidden & Lewis are architects.

No sub-contracts have yet been issued for the 12-story apartment house, 140 x 102.2 feet, which the Gotham Building & Construction Company, 2 West Eighty-sixth Street, is to build on the northwest corner of Central Park West and Eighty-fifth Street, at a cost of $950,000. Mulliken & Moeller, 7 West Thirty-eighth Street, are the architects.

Bids will soon be received by James Knox Taylor, supervising architect, treasury department, Washington, D. C., for a $250,000 hospital building to be erected for the department of commerce and labor, at the Immigration Station on Ellis Island.

It is reported that a 4-story school building, 67 x 96 feet, will be erected on One Hundred and Eleventh Street, west of Lexington Avenue, for the Talmud Torah Synagogue, at a cost of $129,000. Michael & Mitchell, Bernstein, architects.

The First German Presbyterian Church of Brooklyn has secured a site at Myrtle and Forest Avenues, Ridgewood, Queens, and will erect a new edifice to cost $100,000.

Henri Fouchaux, Broadway and One Hundred and Sixty-second Street, it is stated, has plans ready for the 5-story, 32-family flat, 75 x 98 feet, for the Bohemian Workingmen's Association, to be erected on the north side of Seventy-second Street, 373 feet east of Avenue A, to cost $75,000.

C. B. J. Snyder, Park Avenue and Fifty-ninth Street, has prepared plans for a $350,000 school building to be erected at Clinton and Cherry Streets.

No building contracts have yet been awarded for the new 12-story elevator apartment house, 57 x 90.5 feet, which the Five Hundred and Forty Park Avenue Corporation, 52 William Street, is to erect at No. 540 Park Avenue, at a cost of $350,000. Plans by William A. Boring, 32 Broadway, call for terra cotta facing, bluestone and terra cotta coping, slag roof, Roebling system floors, etc.

The new Y. M. C. A. building will be erected by the Young Men's Christian Association on East Twenty-eighth Street. Estimated cost $400,000.

A building permit has been issued for a 5-story brick store and tenement, to be erected at Stockton Street and Throop Avenue, at a cost of $50,000. J. Gradsky, 9 Graham Avenue, is the owner; R. T. Rasmussen, 30 Graham Avenue, the architect.

Plans have been filed for the erection of a 5-story brick and stone residence at 16 East Sixty-eighth Street for Chas. Brenden, cost, $50,000. Chas. Brenden & Co., architects.

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It is reported that C. P. H. Gilbert, Twenty-fifth Street and Broadway, is architect for a residence which is to be erected at 15-17 East Eightieth Street for Paul M. Warburg, who now lives at Hamburg, Germany. It is to be a 6½-story stone building. Estimated cost, $100,000.

Paterno Bros., it is stated, will erect two 10-story brick and stone apartment houses to cost $400,000, at One Hundred and Sixteenth Street and Broadway. Schwartz & Gross, architects.

Oakland, Cal.—It is now definitely announced that work will soon begin on the

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new $500,000 hotel in which Secretary Stearns of the Chamber of Commerce is interested, and it is expected that the hotel will be completed within a year.

OELWEIN, IA.—It is reported that it has been announced that the Chicago Great Western Railway (A. Munster, Chief Engineer, St. Paul, Minn.) would expend $50,000 soon in the erection of a storehouse and in making other improvements here.

OMAHA, NEB.—The Capital City Brick and Pipe Company has been awarded the contract for the construction of the Rome Hotel, at Sixteenth and Jackson Streets, at $100,000.

It is reported that John Latenser, architect, has plans for a modern temple for Congregational Israel to be erected at Park Avenue and Jackson Street.

Plans are being prepared under the direction of Commissioner Brunning for the erection of a courthouse which is to cost $1,000,000. It will have two large wings each five stories in height.

The contract for the erection of the Romeo Hotel, at Sixteenth and Jackson Streets, has been let to the Capital City Brick and Pipe Company. It is to cost $100,000.

OTTAWA, ONT.—It is reported that competitive plans are soon to be asked from Canadian architects only, for a wing to be erected on the west side of the Parliament Building. David Ewart, Chairman, Architects Public Works, may be able to give further information.

OWEN, WIS.—G. E. Anderson, clerk, will receive bids until 2 P. M., October 1, for the erection of a two-story and basement brick and cut stone school building, from plans by Thori, Alban & Fisher, architects, of St. Paul. Separate bids will be received for the heating and plumbing.

PANACEA, N. C.—Press reports state that the Panacea Springs Company will build a hotel here. George S. Prichard, manager, Greenville.

PATERSON, N. J.—The State architect, it is stated, has approved the plans for the High school, as prepared by Wm. T. Fanning, Colt Building.

PHILADELPHIA, PA.—Plans are being prepared by C. M. Antenreith, architect, 410 Walnut Street, for an addition to the department-store of Lit Bros., at Seventh and Market Streets. It is to be a six-story brick, concrete and steel building of fireproof construction. Estimated cost, $150,000.

Plans are being prepared by the John D. Allen Company, Betz Building, for the erection of a $1,000,000 theater, to be known as the Majestic Theater, on North Broad Street. The building will be of fireproof construction throughout, and will have a seating capacity of 4,500.

The Building Committee, it is stated, has selected certain architects to submit competitive plans for the Temple College Building, which is to be erected on Broad Street. The plans are to provide for an eight-story building, 129x140 feet, to cost about $250,000.

Bids are asked by H. G. Dagit, architect, 435 Chestnut Street, for the erection of a seven-story brick and reinforced-concrete warehouse, to be erected for the Conway Estate, at 210-212 North Twelfth Street.

The Bell Telephone Company, it is stated, has secured a site at Broad and Spruce Streets, and will erect a ten or twelve-story office building, estimated to cost, including equipment, about $1,000,000.

McCandless Reining & Co. have had plans prepared by C. B. Comstock, architect, East End Hotel, Pittsburg, for a four-story abattoir, 180x220 feet, to be erected at Thirtieth and Market Streets. Cost, $500,000.

The Board of Education, it is stated, is about to ask bids for erecting a brick and stone elementary school at Second and Wolf Streets, to contain 24 classrooms and cost about $225,000.

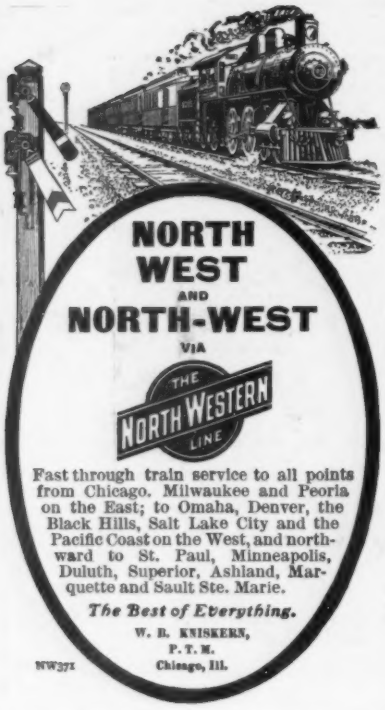
Plans have been prepared by Director Potter, of the Department of Public Safety, for the combination police and fire station, to cost $75,000, to be erected at Fourth Street and Snyder Avenue.

The Deemer Manufacturing Company, J. L. Snyder, superintendent, Wellsboro, Pa., proposes the erection of a $100,000 lumber mill having a daily capacity of 150,000 feet, in Neshoba County.

PINE BLUFF, ARK.—Gibbs & Sanders, of Little Rock, it is stated, are preparing plans for a three-story store and office building, to be erected at Second and Main Streets, by Fred Senyard and Jeff Hicks.

PITTSBURG, PA.—Architect R. M. Trimble, Ferguson Building, has plans nearly ready for estimates on the Y. M. C. A. building at Butler and Forty-fifth Streets. Cost, $50,000. Address W. J. Zahniser.

The Baldwin Locomotive Works, it is stated, have awarded the contract to erect a four-story shop, 62x108x99 feet, at Fifteenth and Hamilton Streets, to Roydhouse, Arey & Co., Fidelity Mutual Life Building, probable cost, $50,000.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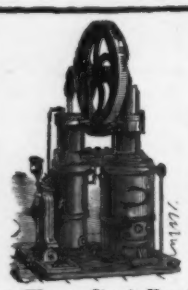

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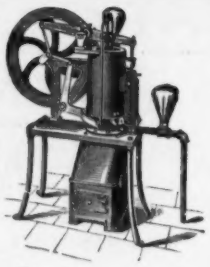

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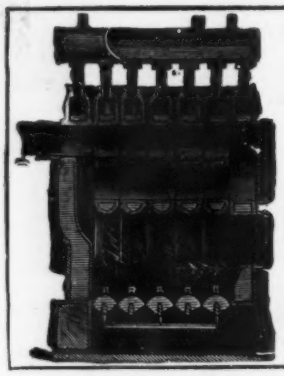

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It is reported that the contract is soon to be let for erecting the five-story building at Old and Forbes Avenues, for the Newsboys' Home. Probable cost, $125,000. Alden & Harlow, Farmers' Bank Building, are the architects.

It is stated that building permits have been issued to Henry Phipps, to erect a fourteen-story steel and brick building at Duquesne Way and Cecil Alley, to cost $200,000.

Chas. Bickel, 524 Penn Avenue, it is stated, has been engaged to prepare plans for an eight-story warehouse to be erected for Isaac Kaufman on Liberty Avenue, near Twelfth Street, at a cost of $60,000.

Reports state that the Roman Catholics will build a $75,000 church in Brookline, a suburb of Pittsburg. Plans will be drawn soon. Address Rev. Father Devlin, Carson Street, South Side.

The National Reform Association, it is stated, has decided to erect a $300,000 twelve-story building on Eighth Street.

Quanah, Tex.—It is reported that the citizens of Hardeman County have voted to issue $50,000 bonds for erecting a courthouse.

St. Joseph, Mo.—The First Methodist Church here contemplates erecting a new church edifice at the northeast corner of Tenth and Charles Streets. The work will begin probably not later than November 1 and will cost an aggregate of not less than $70,000. Two sets of plans and specifications have been submitted by Architect R. S. Bagley, 1273 Euclid Avenue, Cleveland, O

St. Louis, Mo.—It is reported that plans have been prepared for a concrete building, 60x80 feet, to be erected for the Liberty Foundry Company for the manufacture of castings.

St. Louis Implement Company has applied for a permit to erect a six-story building, 80x150 feet. Estimated cost, $85,000

Negotiations are being conducted for the erection of a fifteen-story office building and theater, to be thoroughly fireproof and modern in every respect, and cost $450,000.

According to reports, the Public Library Board has decided to erect a new library building on Olive Street, between Thirteenth and Fourteenth Streets, in the near future. Capital, $1,500,000.

St. Paul, Minn.—The erection of an eight-story addition to the Ericsson School, to cost $30,000, is reported under consideration.

San Antonio, Tex.—The Elks Society here has purchased property known as Old Maverick Printing House, and will remodel same for a hall, etc., to cost $50,000. No architect or contractor selected yet.

San Diego, Cal.—Architect Harrison Albright, 1201 West Thirty-seventh Street, of Los Angeles, Cal., has prepared plans for the John D. Spreckels Building, which is to be erected at the corner of D and Third Streets. The structure will be 150x85 feet and six stories high. Cost, $165,000.

The Ferlin National Exchange, it is stated, has filed articles of incorporation with a capital of $200,000, and intends erecting a business building four stories high.

It is reported that a High school building to cost $130,000, will be erected here.

San Francisco, Cal.—The Towle Estate Company, it is stated, will build a new hotel 80x180 feet, to be called the Golden Eagle, at the northeast corner of Third and Clementina Streets. Cost, $100,000. O'Brien & Werner; 1683 Ellis Street, are the architects.

The Board of Education, it is stated, has accepted the offer of the Ohio Society of California to erect a $100,000 school, to be known as the Ohio School.

The William Wilson Company will expend about $300,000 in improvements on four downtown buildings, among them a six-story brick and stone building on Montgomery Street, $75,000, and for a six-story building on Post Street, $130,000.

B. G. McDougall, 330 Pine Street, it is stated, has prepared plans for a seven-story building, to be erected at Market and First Streets, for the Mark Sheldon Company, at a cost of $300,000.

Dr. Julius Rosenstern, it is stated, will erect on the site of the former Hotel Grenada, at Sutter and Hyde Streets, a seven-story hotel, to be known as Hotel Grenada and to cost $200,000.

Reports state that the Bank of Italy will soon begin the erection of its building at Montgomery and Clay Streets. It is to be a ten-story building. Estimated cost, $200,000.

An eight-story class A building is to be erected at Fourth and Market Streets by the Pacific Company, at a cost of $750,000.

A seven-story $100,000 steel building will be erected here by the Rosenbaum Estate, at California and Front Streets. Salfield & Kohlberg, architects, 239 Kearney Street.

The Woodruff Company, of Buffalo, N. Y., it is reported, has secured the contract for erecting a four-story reinforced-concrete fireproof building on California Street, for

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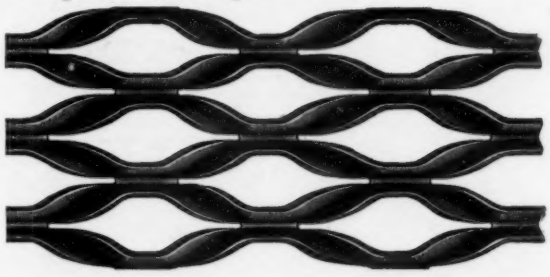

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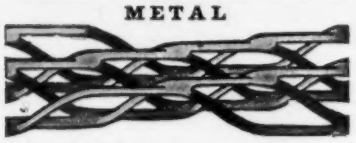
METAL Truss  Lath

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Santa Ana, Cal.—It is reported that a new post-office is to be erected here.

Santa Cruz, Cal.—It is reported that the Santa Cruz Company will erect a bathhouse and theater here at a cost of $200,000. It is to be a two-story, wood, steel and cement building. Bids are being received. W. H. Weeks, 6 East Street, San Francisco, architect.

Savannah, Ga.—Bids are asked by the Y. M. C. A. Building Committee, until October 15, for the labor and materials for the erection of a building in this city. Bids will be opened at the office of Wallin & Young, architects.

Seattle, Wash.—All bids for the construction of the Municipal Building and City Jail were rejected. The city will construct a three-story reinforced-concrete building by day labor. Cost, about $175,000.

Breitung & Buchinger, Walker Building, are drawing plans for a nine-story hotel building for Maurice Gerber, to be located at the corner of Ninth and Pike Streets. The structure is to be 120x120 feet. Cost, $150,000.

Sioux City, Ia.—The First Presbyterian Society is considering the erection of a $50,000 church.

Tacony, Pa.—Wm. Steele & Sons, of Philadelphia, it is stated, have secured the contract to erect a four-story reinforced-concrete manufacturing building, 101x153 feet, at Milnor and Unruh Streets, for the Erben & Harding Company, at a cost of $110,000.

Terre Haute, Ind.—It is reported that the Trustees of the Indiana Normal School are considering the erection of a dormitory.

Toledo, O.—The Commonwealth Building Company, it is stated, intends erecting the Secor Hotel at a cost of about $800,000.

Toronto, Ont.—The members of St. Anne's Anglican Church, it is stated, have decided to erect an edifice at Gladstone Avenue and St. Anne's Road, to cost $35,000.

Vicksburg, Miss.—Lodges Washington, Lee and Virginius, of the Knights of Pythias, will erect a new $50,000 brick building in this city. The building is to be three to four stories high.

Walla Walla, Wash.—Plans have been prepared by the Motter-Wheeler Company for a four-story brick block. Cost, $100,000.

Washington, D. C.—The National Metropolitan Citizens' Bank will erect an addition to their new building. Cost, $250,000

Bids will be asked within a few days under revised specifications by Superintendent Elliott Woods, U. S. Capitol building and grounds, for the new heating, lighting and power plant to be erected near the U. S. Capitol Building.

David Moore, 1328 New York Avenue, will erect an eight or ten-story building. Cost, $150,000.

Frank Miles Day & Bro., of Philadelphia, Pa., it is reported, have been engaged to prepare plans for the tuberculosis hospital which is to be erected in Washington for the Government, at a cost of about $100,000.

Plans are being prepared by Harding & Upman, architects, 729 Fifteenth Street, N. W., for the erection of a hotel at New Jersey and C Streets, for the Congress Hall Hotel Company. It is to be an eight-story, brick, stone and steel building, of fireproof construction. Estimated cost, $300,000.

Sealed proposals for furnishing plant, labor and materials, and completely erecting a fireproof marble-faced mess-hall and dormitory, at the United States Soldiers' Home, will be received until October 23, at the office of Capt. John Steven Sewell, Corps of Engineers, constructing officer, P. O. Box 455, from whom plans and specifications may be obtained on deposit of $25.

The company which proposes erecting a hotel at Pennsylvania Avenue and Fourteenth Street, at a cost of about $500,000, is about to select an architect to prepare plans for the building. Christian Heurich, John Williams and F. V. Killian are among the trustees.

Plans have been prepared by Capt. Elliott Woods, superintendent of United States Capitol, for a magnificent Temple of Justice, to be used as a home for the Surpeme Court of the United States. Cost, $3,500,000.

West Point, N. Y.—The Buckley Realty & Construction Company, Times Building, Forty-second Street and Broadway, New York, has submitted the lowest bid for the construction of the quarters for the bachelor officers at the Military Academy, West Point, N. Y. The structure is to be of the best fireproof construction, three stories, 50x180 feet. Messrs. Cram, Goodhue & Ferguson, 170 Fifth Avenue, are the architects.

Yonkers, N. Y.—Estimates on revised plans for the new Yonkers Homeopathic Hospital, to be erected at Ashburton and Park Avenues, Yonkers, are now being received by the architects, Messrs. Kendall, Taylor & Stevens, 93 Federal Street, Boston, Mass.

The New York Edison Company, 55 Duane Street, Thomas E. Murray, engineer, Charles F. Hoppe, architect, is preparing plans for a transformer station to be erected at Yonkers, N. Y. Two stories, fireproof, brick, stone and steel, 100x40 feet.

York, Pa.—Plans have been approved for the erection of a jail in this city, at an estimated cost of $150,000. B. F. Willis is architect.

Youngstown, O.—It is reported that the Trussed Concrete Steel Company, of Detroit, Mich., will erect a plant near this city.

Youngstown, N. Y.—Bids are asked by the Constructing Quartermaster until 11 A. M., October 19, for the construction of one double set of officers' quarters, one set of bachelors' quarters and one barracks.

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New York Blower Co., Chicago.

**ARCHITECTURAL ORNAMENTS.**
Emmel, Charles, Boston.

**ARTIFICIAL MARBLE.**
Mycenian Marble Co., New York.

**ASPHALT.**
American Asphaltum & Rubber Co., Chicago.
Neuchatel Asphalt Co., New York.

**ASPHALT ROOFING.**
American Asphaltum & Rubber Co., Chicago.
Barber Asphalt Paving Co., Philadelphia.

**BLUE PRINTS.**
Moss, Chas E., Boston.
Spaulding Print Paper Co., Boston.

**BLUE PRINT MACHINES (Electric).**
Wagenhorst, J. H. & Co., Youngstown, O.

**BRONZEWORK (Ornamental).**
Gorham Mfg. Co., New York.
Jackson, Wm. H., Co., New York.
Richey, Browne & Donald, Maspeth, L. I., New York City.
Winslow Bros. Co., The, Chicago, Ill.

**CAPITALS AND COLUMNS.**
Hartmann Bros. Mfg. Co., Mount Vernon, N. Y.

**CARPETS, RUGS.**
W. & J. Sloane, New York

**CEMENT.**
Alsen's Cement Works, New York.
Atlas Cement Co., New York.
Illinois Steel Co., Chicago.

**COLUMNS (Lock Joint).**
Hartmann Bros. Mfg. Co., Mount Vernon, N. Y.

**CONCRETE CONSTRUCTION.**
Gilbreth, Frank B., New York
R. S. Blome Co., Chicago.
Underwriters' Engineering and Construction Co., New York.

**CONCRETE PILING.**
Alling Construction Co., Chicago.
Corrugated Concrete Pile Co., New York.
Engineering-Contracting Co., Baltimore.
Miller, William L., Boston.
Raymond Concrete Pile Co., Chicago, Ill.

**CONSERVATORIES.**
Hitchings & Co., New York.
Lord & Burnham Co., New York.

**CONTRACTORS AND BUILDERS.**
Frank B. Gilbreth, New York.
Morrill & Whiton Construction Co., Boston.
Underwriters' Engineering and Construction Co., New York.

**CORDAGE.**
Samson Cordage Works, Boston.

**CORRESPONDENCE SCHOOLS.**
American School of Correspondence, Chicago.

**DOORS (Balance).**
Pitt Balance Door Co., New York.

**DOORS (Fireproof Metal-covered).**
Fire Proof Door Co., Minneapolis, Minn.

**DOORS (Steel Rolling).**
Kinnear Mfg. Co., The, Columbus, O.

**DRAUGHTSMEN'S SUPPLIES.**
Favor, Ruhl & Co., New York.
Soltmann, E. G., New York.

**ELECTRIC PLATE WARMERS.**
Prometheus Electric Co., New York.

**ELECTRIC SIGNALS.**
Elevator Supply & Repair Co., New York.

**ELEVATORS, ETC.**
Otis Elevator Co., New York.

**ENGINES (Hot Air).**
Rider-Ericsson Engine Co., New York.

**FAN SYSTEM.**
Sturtevant Co., B. F., Boston.

**FILTERS.**
Loomis-Manning Filter Co., Philadelphia, Pa.
Cummings Filter Co., Pittsburgh, Pa.

**FIRE-ESCAPES.**
Standard Fire-escape & Mfg. Co., Boston.

**FIREPROOFING.**
Associated Expanded Metal Co., New York.
Blome, R. S., Co., Chicago.
Clinton Wire Cloth Co., Clinton, Mass.
Expanded Metal and Corrugated Bar Co., St. Louis.
Gilbreth, Frank B., New York.
Imperial Expanded Metal Co., Chicago.
National Fireproofing Co., Pittsburgh, Pa.
Trussed Concrete Steel Co., Detroit.
Turner Construction Co., New York.
"Unit" Concrete Steel Frame Co., Philadelphia, Pa.
Underwriters' Engineering and Construction Co., New York.

**FIREPROOF LATHING.**
Hayes, Geo., New York.

**FIREPROOF SHUTTERS.**
Kinnear Mfg. Co., The, Columbus, O

**FLOOR POLISH.**
Butcher Polish Co., Boston.

**FUEL ECONOMIZERS.**
Sturtevant Co., B. F., Boston, Mass.

**GLASS GLOBES.**
Holophane Glass Co., New York.

**GRATES, MANTELS, ETC.**
Wm. H. Jackson Co., New York.

**GREENHOUSES.**
Hitchings & Co., N. Y.
Lord & Burnham Co., N. Y.

**HARDWARE.**
Stanley Works, New Britain, Conn.
Yale & Towne Mfg. Co., Stamford, Ct.

**HEATING APPARATUS (Hot Water).**
Gurney Heater Mfg. Co., Boston.
Hitchings & Co., New York.
H. B. Smith Co., New York.

**HEATING APPARATUS (Steam).**
Hitchings & Co., New York.
Smith Co., H. B., New York.

**INSULATED WIRE.**
The Okonite Co. (Ltd.), N. Y.

**INTERIOR DECORATION.**
Huber, H. F. & Co., New York.

**INTERLOCKING RUBBER TILING.**
See Tiles (Interlocking Rubber).

**IRONWORK (Ornamental).**
Jackson, Wm. H., Co., New York.
W. H. Mullins Co., Salem, Ohio.
Pitt, Wm. R., Iron Works, New York.
Richey, Browne & Donald, Maspeth, L. I., New York City.
Winslow Bros. Co., The, Chicago, Ill.

**LAUNDRY MACHINERY.**
Troy Laundry Machinery Co., Troy, N. Y.

**MAIL CHUTES.**
Cutler Mfg. Co., Rochester, N. Y.

**MARBLE-WORKERS.**
The Robert C. Fisher Co., New York.

**MECHANICAL CLEANING.**
American Air Cleaning Co., Milwaukee, Wis.

**METAL CEILING.**
The Berger Mfg. Co., Canton, Ohio.
W. H. Mullins Co., Salem, O.
See also Fireproofing.

**METAL LATHING.**
American Rolling Mill Co., Middletown, O.
G. Hayes, New York.
Truss Metal Lath Co., New York.

**METAL SETTINGS (for Glass).**
Flanagan & Biedenweg, Chicago.

**MINERAL WOOL.**
U. S. Mineral Wool Co., New York

**MORTAR COLORS.**
Saml. H. French & Co., Phila., Pa

**PAINT.**
Joseph Dixon Crucible Co., Jersey City, N. J.
National Lead Co., New York.
New Jersey Zinc Co., New York.

**PHOTOGRAPHS.**
J. W. Taylor, Chicago, Ill.

**PLASTER ORNAMENTS.**
Samuel H. French & Co., Phila., Pa.

**PLUMBING GOODS.**
Woolf, L., Mfg. Co., Chicago.

**PNEUMATIC TANKS.**
Kewanee Water Supply Co., Kewanee, Ill.

**PRISM LIGHTING.**
American Luxfer Prism Co., Chicago.
Holophane Glass Co., New York.

**PUMPS.**
Rider-Ericsson Engine Co., New York.

**REFLECTORS.**
I. P. Frink, New York.
Holophane Glass Co., New York.

**REINFORCED CONCRETE.**
Clinton Wire Cloth Co., Clinton, Mass.
Expanded Metal and Corrugated Bar Co., St. Louis.
Gilbreth, Frank B., New York.
Trussed Concrete Steel Co., Detroit.
Turner Construction Co., New York.
Underwriters' Engineering and Construction Co., New York.
W. N. Wight & Co., New York.

**ROOFING MATERIALS.**
Barber Asphalt Paving Co., Philadelphia.
Bird, F. W. & Son, East Walpole, Mass.
Blome, R. S., Co., Chicago.
Keasbey & Mattison Co., Ambler, Pa.
See also Asphalt Roofing.

**SASH-CORD.**
Samson Cordage Works, Boston.
Silver Lake Co., Boston.

**SCHOOLS OF ARCHITECTURE.**
Lawrence Scientific School, Harvard University, Cambridge, Mass.
Massachusetts Institute of Technology, Boston.
Ohio State University, Columbus, O.
Society of Beaux-Arts Architects The, New York.
University of Michigan, Ann Arbor.
University of Pennsylvania, Philadelphia, Pa.
Washington University School of Engineering and Architecture, St. Louis, Mo.

**SHEET-METAL WORK.**
Berger Mfg. Co., Canton, O.
W. H. Mullins Co., Salem, O.
J. S. Thorn Co., Phila., Pa.

**SHUTTERS (Steel Rolling).**
Kinnear Mfg. Co., The, Columbus, O.

**SKYLIGHTS, ETC.**
George Hayes, New York.
W. H. Mullins Co., Salem, O.
Vaile & Young, Baltimore, Md.

**STABLE FIXTURES.**
Broad Gauge Iron Stall and Vane Works, Boston.

**STAIR TREAD.**
American Mason Safety Tread Co., Boston

**STEEL ROLLING-DOORS.**
Kinnear Mfg. Co., The, Columbus, O.

**TERRA-COTTA.**
The Northwestern Terra-Cotta Co., Chicago, Ill.

**TILES.**
Jackson, Wm. H., Co., New York

**TILES (Interlocking Rubber).**
Goodyear Tire & Rubber Co., Akron, O.
N. Y. Belting and Packing Co., Ltd., New York.
Pennsylvania Rubber Co., Jeannette, Pa.

**VALVES AND PACKING.**
Jenkins Bros., New York.

**VENTILATING APPARATUS**
Globe Ventilator Co., Troy, N. Y.
New York Blower Co., Chicago.
Sturtevant, B. F., Co., Boston.
Thomas & Smith, Chicago.

**WATERPROOFING.**
Bird, F. W., & Son, East Walpole, Mass

**WATER SUPPLY SYSTEMS.**
Kewanee Water Supply Co., Kewanee, Ill.

**WEATHER VANES.**
T. W. Jones, New York.

**WINDOW LINE.**
Samson Cordage Works, Boston.

**WIRE GLASS WINDOWS.**
George Hayes, New York, N. Y.
James A. Miller & Bro., Chicago, Ill.

**WOODWORKERS.**
Huber, H. F. & Co., New York.

**ZINC WHITE.**
New Jersey Zinc Co., New York.